Vol. 130, Number 3. MARCH, 1929 Price 25 Cents

AMERICAN GAS JOURNAL

Established 1859 *Pioneer of the Gas Industry*

Including · GAS INDUSTRY · Est. 1900 ·

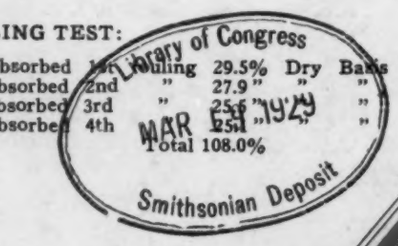
You consider the Analysis of Oil or Coal before purchasing, why not the Analysis of *Purifying Materials?* It is just as important.

A shipment received Dec. 19, 1928 showed the following test as per Chemical Service Laboratories, Philadelphia.

Total Iron (Calc. as Fe_2O_3) . . . . 59% Dry Basis.)

FOULING TEST:

H_2S absorbed	1st	Fouling	29.5%	Dry Basis
H_2S absorbed	2nd	"	27.9 "	" "
H_2S absorbed	3rd	"	25.6 "	" "
H_2S absorbed	4th	"	25.1 "	" "
		Total	108.0%	



Lux Material

BEST GAS PURIFIER

THE ALPHA-LUX CO., INC., 192 FRONT ST., N.Y.

Gas Works with insufficient purifying capacity are especially interested in "LUX-SPONGE" Without additional equipment our Sponge raises Purifying Capacity to the ratio of 3:1. We use carefully selected large tough shavings in our Sponge. Particulars on request.

Koppers
Phenol Removal System
for the
Bethlehem Steel Company's
Lackawanna Coke Plant

The Bethlehem Steel Company has contracted with the Koppers Construction Company for the installation of apparatus to remove phenol from its coke plant wastes at Lackawanna.

The trouble caused by excessive amounts of phenol in public water supplies which are subjected to chlorine treatment is well known to the industry. The difficult problem of phenol removal has now been solved and efficient apparatus is now available.

Koppers Phenol Removal Apparatus is in highly successful operation at the plant of the Hamilton Coke and Iron Company at Hamilton, Ohio. Another installation is in operation for the Philadelphia Coke Company.

The Koppers Construction Company

Chicago **Pittsburgh** **New York**

AMERICAN
GAS JOURNAL
Established 1859 *Pioneer of the Gas Industry*
Including GAS INDUSTRY Est. 1900

Executive and Editorial Offices, 53 Park Place, New York City

S. G. KRAKE, *President and Treasurer* A. M. GLEASON, *Secretary*

H. M. RILEY, *Editor*

R. S. McBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 130, No. 3 **March, 1929** Whole Number 3663

TABLE OF CONTENTS

The Public Ownership Question—Is It Open or Settled? ... 23
Filling the Summer Valleys in the Seasonal Load Curve ... 24
The Domestic Gas Problem ... 24
An Opportunity to Invest in Trained Gas Engineers ... 25
Including Convertible Features in New Utility Bonds ... 25
Chain-Store Selling of Gas Appliances ... 25
Installing High-Pressure Mains—By G. Goodwin ... 27
Coal and Coke Breakage and Segregation—By E. G. Blackwell ... 30
Thermal Insulation of Gas Consuming Appliances ... 33
Railroad Shops Adopt Gas After Exhaustive Test—By E. E. Pierson ... 36
Selling Industrial Gas ... 38
Why Does Coal Coke?—By Wilbert J. Huff ... 40
Keeping 800,000 Accounts Without Books—By John J. McGrath ... 43
Functions of a Public Utility Statistical Department—By Barclay J. Sickler ... 45
Technical and General Miscellany ... 47
Matlack's Merchandising Memoranda ... 50
Perfume, Cigarettes and Gas—By W. F. Rightor ... 53
Follow Up Range Customers and Sell Them Other Goods—By Frank H. Williams ... 54
Berlin Takes Its Home Service Work Seriously—And Gets Results—By A. Deane Dowell ... 59
Telling the Public About Gas ... 60
Can This Be the Reason?—By Hylan Piper ... 61
Recent Higher Court Decisions Involving Gas—By Leo T. Parker ... 62
Equipment News ... 64
News of the Gas Industry ... 70
Personals ... 71
Trade News ... 74
Topics of Major Importance Discussed at Pacific Coast Conference ... 80
"Modernize Our Merchandising" Is Cry at Mid-West Sales Conference ... 86

INDEX TO ADVERTISERS, PAGE 121

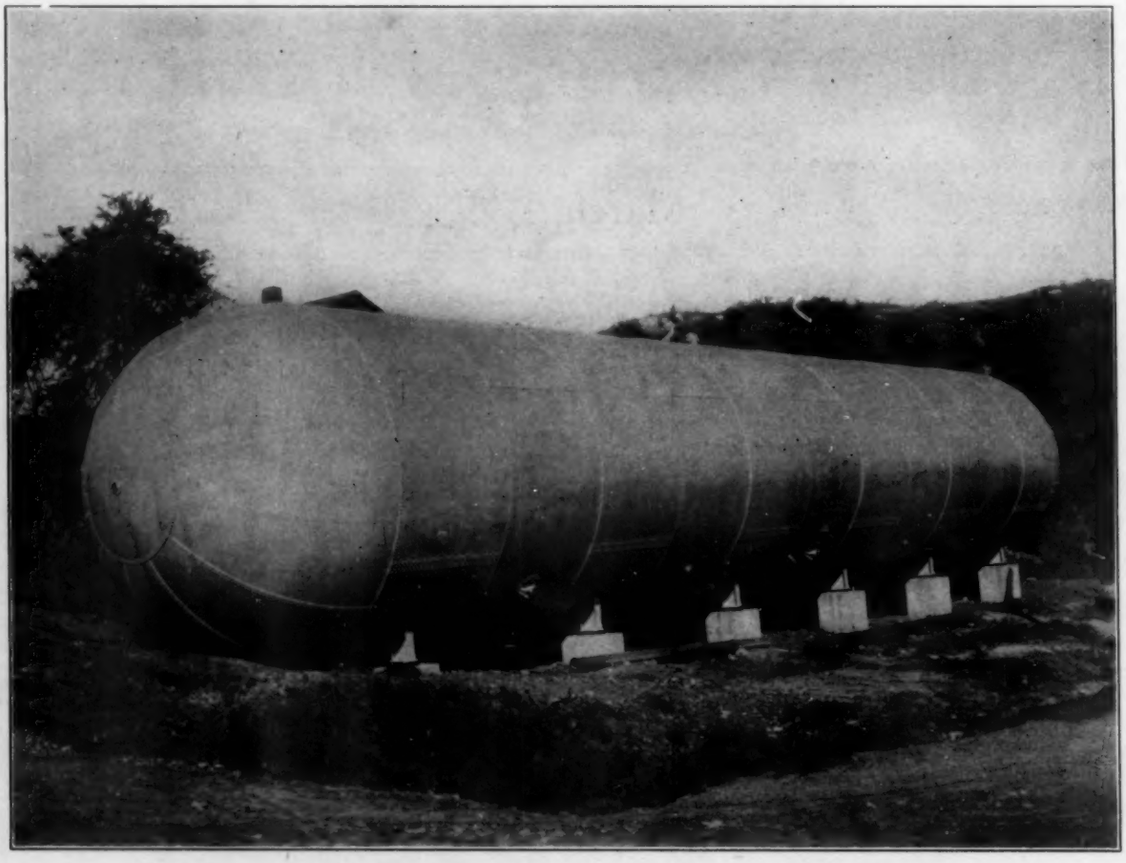
AMERICAN GAS JOURNAL, March, 1929, Vol. 130, No. 3. Published monthly by American Gas Journal, Inc., at 34 N. Crystal St., East Stroudsburg, Pa. Executive, Editorial, and Business offices at 53 Park Place, New York, N. Y. Application made for entry as second-class matter, October 6, 1928, at the postoffice of East Stroudsburg, Pa., under the Act of March 3, 1879.

Subscriptions $2.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada $3.00; foreign $4.00. Single copies 25 cents.

Subscription $2.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada $3.00; foreign $4.00. Single copies 25 cents.

JAMES T. HEED, *Advertising Rep* *53 W. Jackson Blvd., Chicago, Ill.*
F. P. CURLEY, *Service Department,* *53 Park Place, New York.*
NORMAN C. NOURSE, *Advertising Rep.* *681 Market St., San Francisco, Cal.*

HIGH-PRESSURE HOLDERS
OF QUALITY



High Pressure Gas Holder 20′ 0″ diameter by 111′ 0″ long with hemispherical ends, having a storage capacity of 100,000 cubic feet between 5 lb. and 50 lb. pressure. Constructed at Easton, Pa., for the Easton Gas Works.

WRITE US FOR INFORMATION AND QUOTATIONS ON STORAGE OF THIS TYPE.

THE STACEY MANUFACTURING CO.

ENGINEERS AND BUILDERS

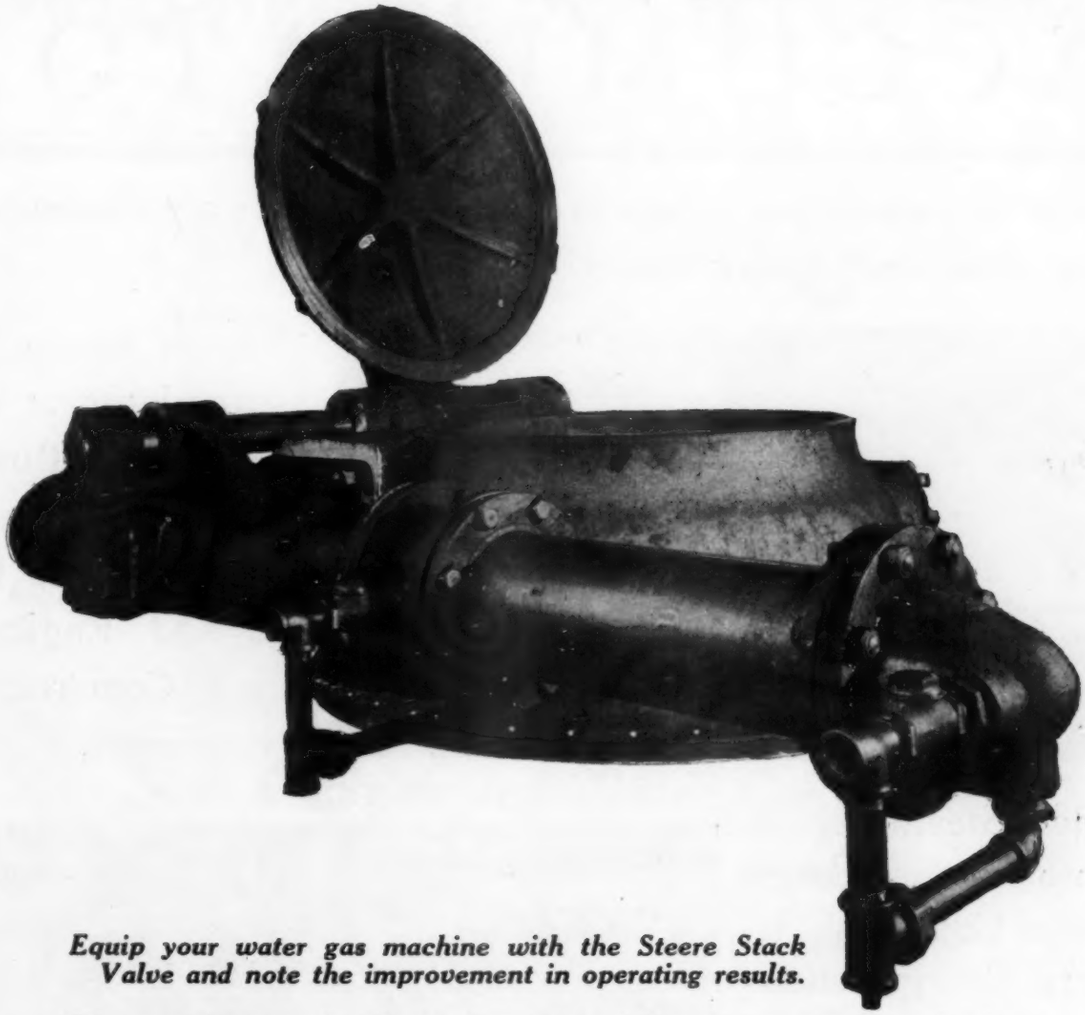
J. FRANK STACEY, *President and General Mgr.*
GEO. H. CRESSLER, *General Sales Mgr.*
T. C. RANSHAW, *Vice-President.*
W. D. BIRBECK, *Sales Engineer.*
A. E. HARVEY, *Sales Engineer.*
EDW. J. BAECHLE, *Secretary and Treasurer.*
FRANK O. PANDORF, *Chief Engineer.*

THE BUILDERS OF STACEY GAS HOLDERS FOR SEVENTY-EIGHT YEARS

CINCINNATI - - OHIO

NEW YORK OFFICE: 52 VANDERBILT AVENUE

Make More Gas per Cycle



Equip your water gas machine with the Steere Stack Valve and note the improvement in operating results.

The manufacture of carbureted water gas is largely a matter of mechanical coordination. Throughout the cycle every second of time must be used to advantage.

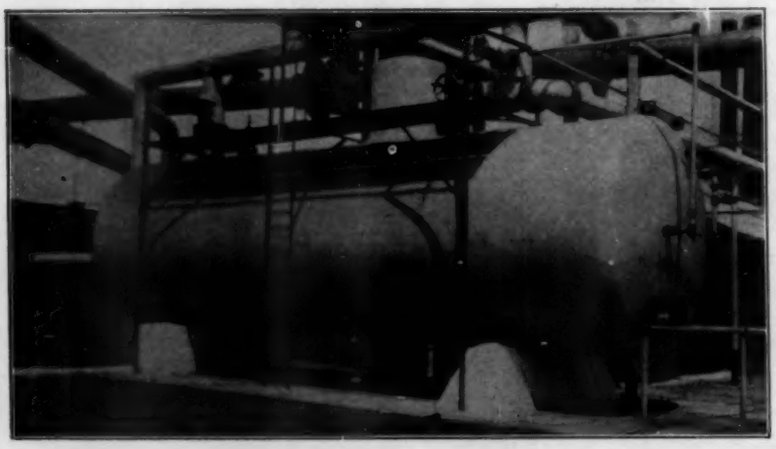
The Steere Superheater Stack Valve, by its rapid and cushioned hydraulic action, will clip many seconds off the blasting time. This valve is only one of several quick-acting parts which can be synchronized perfectly to speed up the machine.

We ship this valve as a unit. Mounting involves nothing more than bolting to the superheater nozzle and connecting to the hydraulic system.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

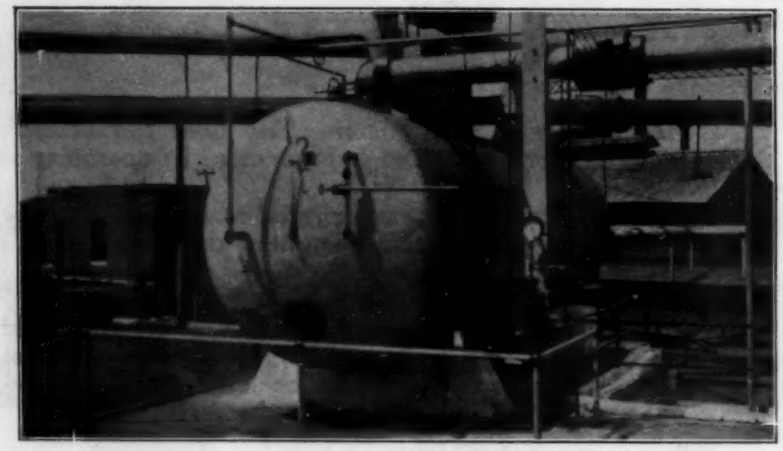
SMOOT STEAM ACCUMULATOR

Over fifty water gas plants in the United States are successfully operating with Smoot Steam Accumulators.



Smoot Steam Accumulator at the Georgia Power Company, Atlanta, Georgia. The United Engineers and Constructors, Engineers.

Smoot Steam Accumulator at Georgia Power Company, Atlanta, Georgia, showing Smoot Control regulating steam pressure from Accumulator to Water Gas Machines.

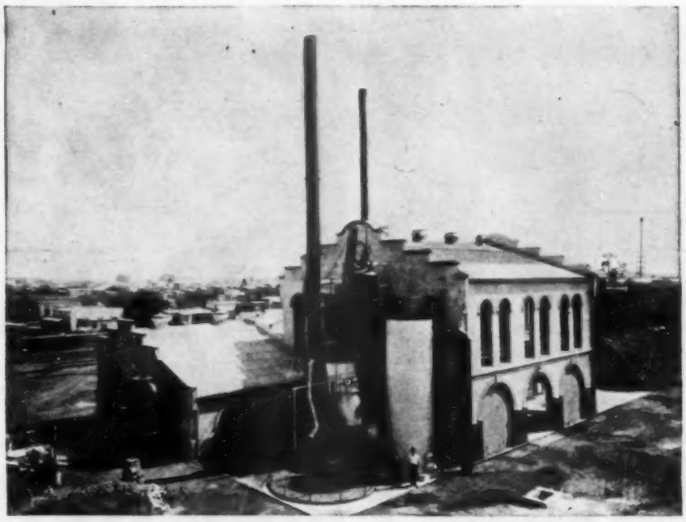


SMOOT ENGINEERING CORPORATION
136 Liberty Street New York

SMOOT CONTROL

AT ROSARIO

ARGENTINE REPUBLIC, S.A.



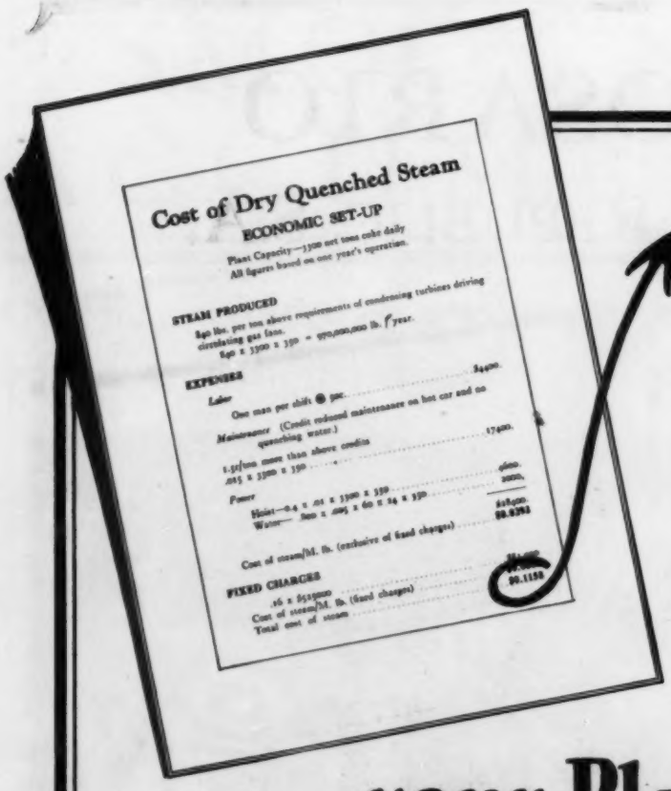
New Carburetted Water Gas Plant

THIS new plant, which was designed and built under our direction at Rosario, is modern and complete in every detail and is operating at exceptionally low cost. Representing the latest word in this type of plant, it is typical of the work we have been doing in the gas industry for generations.

Other carburetted water gas plants built by us in South America include those at Rio de Janeiro and two at Sao Paulo.

THE U. G. I. CONTRACTING COMPANY
DIVISION OF
UNITED ENGINEERS & CONSTRUCTORS
INCORPORATED
DWIGHT P. ROBINSON, PRESIDENT
Broad and Arch Streets, Philadelphia

Chicago Atlanta


Cost of Dry Quenched Steam
ECONOMIC SET-UP
Plant Capacity—1500 net tons coke daily
All figures based on one year's operation.
STEAM PRODUCED
840 lbs. per ton above requirements of condensing turbines driving circulating gas fans.
840 x 1500 x 330 = 970,000,000 lb. / year.
EXPENSES
Labor
One man per shift @ 50c. $4400.
Maintenance (Credit reduced maintenance on hot car and on quenching water.) 1740.
1.5¢/ton more than above credits
.015 x 1500 x 330 7425.
Power
Hoist—0.4 x .01 x 1500 x 330 1980.
Water— 800 x .005 x 60 x 24 x 330 68,640.
Cost of steam/M. lb. (exclusive of fixed charges) $0.0292
FIXED CHARGES
.16 x $550,000 0.1158
Cost of steam/M. lb. (fixed charges)
Total cost of steam

Total Cost of STEAM $0.1158

What would a study of *your* Plant Reveal?

DRY quenching of coke offers attractive savings over wet quenching—for instance—

One thousand pounds of high pressure steam per ton of coke cooled.

Coke with a low uniform moisture content.

Reduced maintenance on hot coke car and plant steelwork through absence of corrosive vapors from quenching water—no cold weather freezing troubles.

High pressure steam at a low cost per thousand pounds.

A physically stronger coke of more uniform size.

Dry quenching is another step forward in reducing waste in coke production.

A copy of the paper "Dry Quenching of Coke" delivered before the Second International Conference on Bituminous Coal will be sent to those interested in Dry Quenching.

Dry Quenching Equipment Corporation

INTERNATIONAL COMBUSTION BUILDING

200 MADISON AVE. NEW YORK — N.Y.

A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

CAST Q IRON

TRADE MARK

THIS "Q-check" mark designates Cast Iron Pipe made in accordance with established technical specifications. The Cast Iron Pipe Research Association has adopted this mark for use by its members.

All pipe, both deLavaud centrifugal and vertically sand cast, made by the United States Cast Iron Pipe and Foundry Company will hereafter bear this symbol. A representative pipe shipment marked with the "Q-check" symbol is shown in the photograph reproduced above, which was taken at the yards of this Company at Burlington, New Jersey.

United States Cast Iron Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: Chicago, Philadelphia, Buffalo, Cleveland, New York, San Francisco, Los Angeles, Seattle, Birmingham, Dallas, Kansas City, Pittsburgh, Minneapolis

Equipping a Moderate Sized Modern Water Gas Plant

In the above illustration we show a typical machinery room, admirably adapted to an up-to-date water-gas plant of moderate size.

The Exhausters, shown in left background, are in duplicate, one of which is held in reserve. The function of these Exhausters is to draw the gas from the relief holder and pump it through tar washer, P. & A. tar extractor, to the purifiers, from which point it returns again to the machinery room and is then passed through the Positive type of Station Meter, shown in right background.

Two High Pressure Pumps, one of which is visible in the left foreground are used to supply water to the plant.

There are also in this room, duplicate Compressors for high pressure gas; but unfortunately for the completeness of the layout, do not show in picture.

All precautions have been exercised to provide absolutely gas tight piping and connections, to that end, all gas piping is of welded steel construction with Van Stone joints.

If you contemplate the erection of a new plant of moderate size, or the alteration of an existing plant, our engineers will gladly assist you.

THE GAS MACHINERY COMPANY

1900 EUCLID AVE., CLEVELAND, OHIO

New England Office, 185 Devonshire St., Boston, Mass. Edwin E. Witherby, Representative

Connersville High Pressure Meters at Hudson Valley Coke & Products Corporation, Troy, New York

Dependable Measurement at the Source in High Pressure Gas Distribution Systems

The linking together of our cities by gas mains and the construction of larger gas manufacturing plants is one of the progressive movements of the gas industry toward more dependable and economic operation. This long distance transmission of gas, of course calls for metering equipment of a reliable type, both at the manufacturing plant or coke oven, and at governor stations.

At Troy, New York, the Hudson Valley Coke and Products Corporation uses the 18 x 27, 16 x 32 and 12 x 24 Connersville High Pressure Meters to record the gas delivered into the lines leading to Albany, Schenectady and to the city of Troy. Duplicate meters are used also by the local distributing organizations.

The users of these meters place confidence in the records because they know that the operating principle and the sturdiness and accuracy of construction of Connersville Meters assure reliability of meter service.

Submit your metering problem to the engineer at the nearest Connersville Office.

The Connersville Blower Company

12th Street and Columbia Avenue
Connersville, Indiana

SALES OFFICES

114 Liberty St.	**Chamber of Commerce Bldg.**	**53 W. Jackson Blvd.**	**250 Stuart St.**
New York City	**Pittsburgh, Pa.**	**Chicago, Ill.**	**Boston, Mass.**

CONNERSVILLE

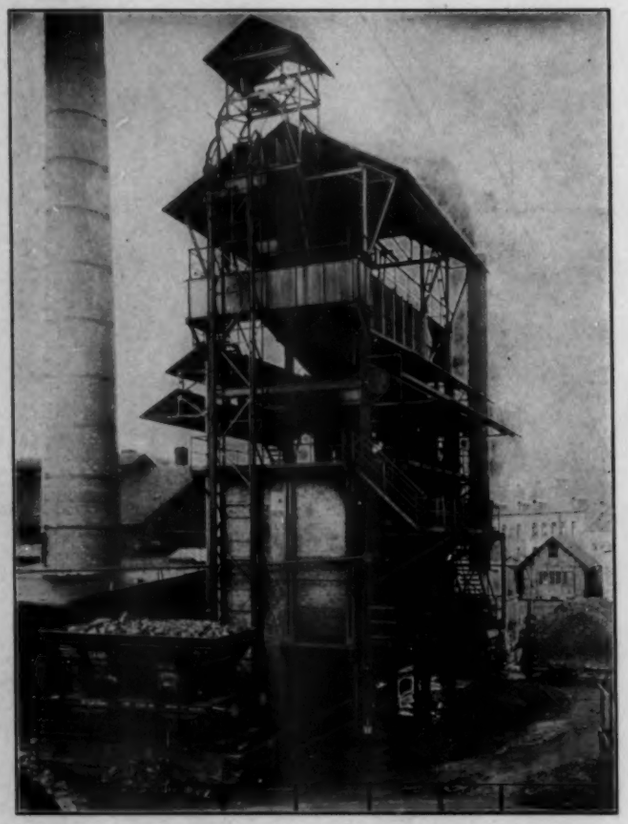
Blowers • Gas Pumps • Meters • Cycloidal Pumps

"INDUGAS"

VERTICAL CHAMBER OVEN

With Water-sealed Drop Door

INTERMITTENT TYPE



Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

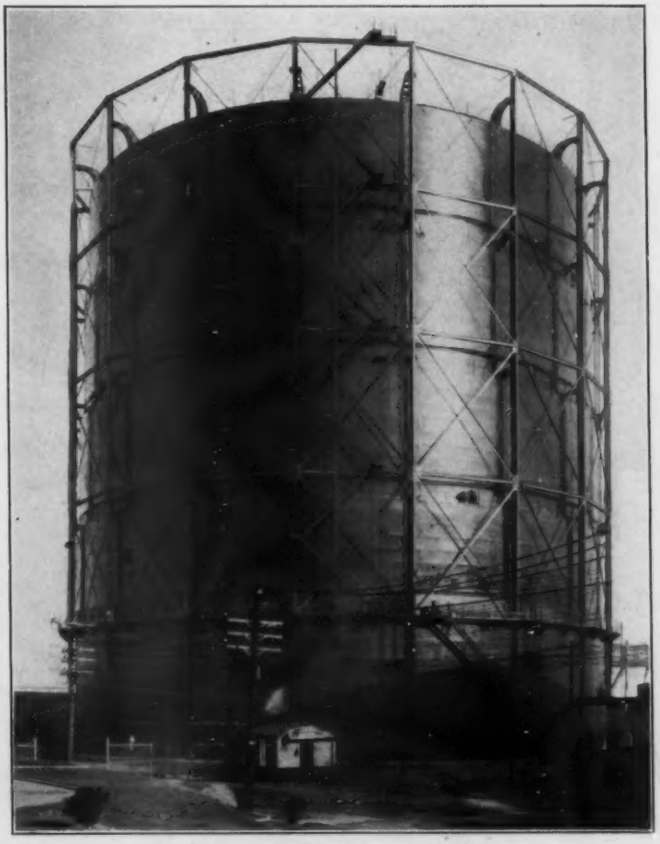
There's a Reason

Full information, layouts and estimates gladly furnished

INDUGAS COMPANY, INC.

114 LIBERTY STREET, NEW YORK

STURDY
CONSTRUCTION PAYS



3,000,000 cu. ft. Holder, Built in 1928

INTEGRITY
FAIR C-K CO DEALING
SERVICE

CRUSE-KEMPER CO.
AMBLER, PA.
ENGINEERS & CONTRACTORS
BUILDERS OF STURDY GAS HOLDERS
PURIFIERS, SCRUBBERS, CONDENSERS, TANKS, ETC.

Champion Gas Coal

Original Thin Vein Youghiogheny—the peer of all gas coals—now dressed and refined.

ON January 20th we shipped our first coal from our new mechanical and automatic Champion dressing plant that is connected with our model Warden Mine.

The results were even better than our highest expectations. The coal is absolutely clean and free from all removable impurities and non-combustibles,—thus materially increasing the gas yield.

This is the third of these great coal dressing plants now successfully operated by this company. A fourth plant will be completed this winter, and the ultimate capacity of these plants will be 30,000 tons daily.

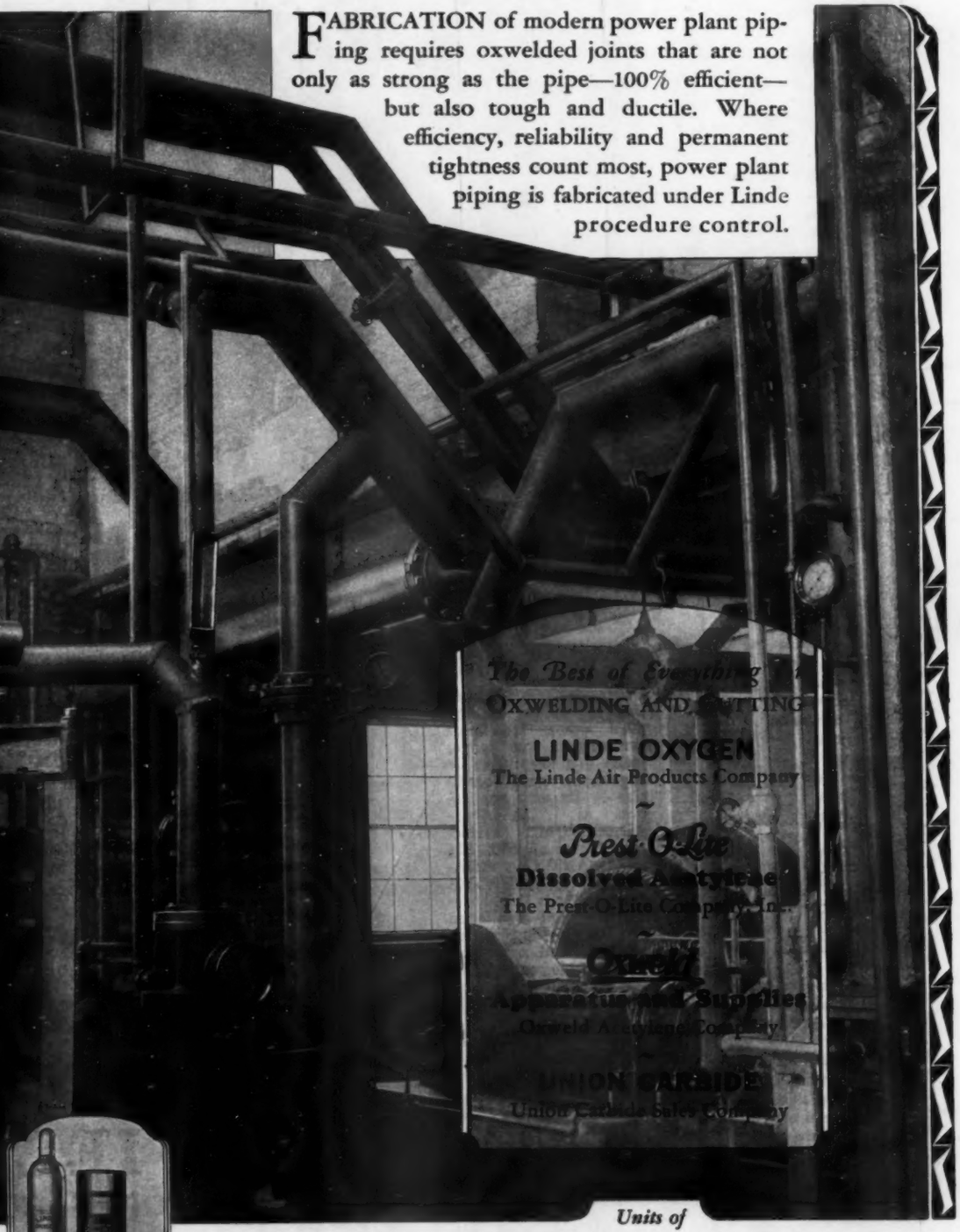
PITTSBURGH COAL COMPANY
Main Offices: PITTSBURGH, PENNSYLVANIA
Sales Offices: Cleveland, Youngstown, Erie, Toronto, Cincinnati, New York, Utica, Buffalo, Sault Ste. Marie

PITTSBURGH COAL CO. OF WISCONSIN
Duluth Minneapolis St. Paul

Sole Distributor Milwaukee District
MILWAUKEE WESTERN FUEL CO.
Milwaukee, Wisconsin

Bigger Power Plants—Higher Efficiencies

FABRICATION of modern power plant piping requires oxwelded joints that are not only as strong as the pipe—100% efficient—but also tough and ductile. Where efficiency, reliability and permanent tightness count most, power plant piping is fabricated under Linde procedure control.



Units of

UNION CARBIDE AND CARBON CORPORATION

General Offices UCC *Sales Offices*

30 East 42nd Street, New York, N.Y. In principal cities of the country

55 Oxygen Plants–36 Acetylene Plants–99 Oxygen Warehouses–100 Acetylene Warehouses–38 Apparatus Warehouses–235 Carbide Warehouses

ADAMANT DISTRIBUTORS

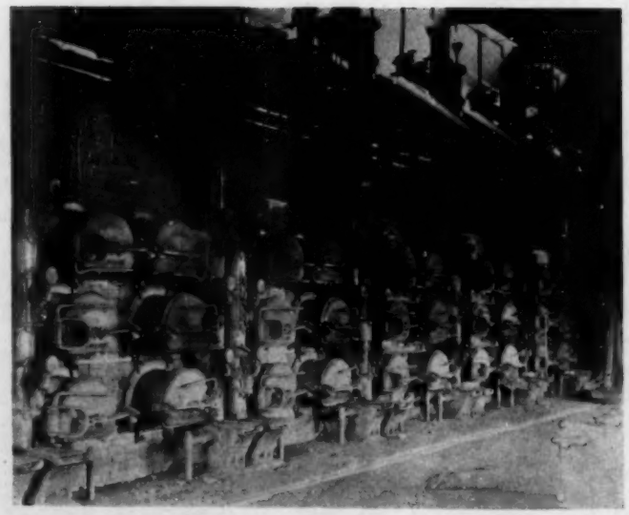
Alabama, Birmingham,
C. B. Davis Engineering Co.
California, Los Angeles
Industrial Supply Co.
California, San Francisco,
W. K. Mushet Co.
Colorado, Denver,
H. W. Thompson
Connecticut, Hartford,
Factory Supply Co.
Connecticut, New Britain,
Beckliffe Bros. Co., Inc.
Connecticut, New Haven,
The Warner-Miller Co.
Georgia, Atlanta,
Atlanta Textile Supply Co.
Illinois, Chicago,
Wm. E. Dee Co.
Indiana, Fort Wayne,
Harry A. Neff
Indiana, Indianapolis,
Indianapolis Belting & Supply Co.
Iowa, Des Moines,
Walrodt Supply Co.
Kansas, Pittsburg,
Marshall Supply Co.
Kentucky, Louisville,
E. D. Morton & Co., Inc.
Kentucky, Paducah,
Henry A. Petter Supply Co.
Louisiana, New Orleans,
Woodward, Wight & Co., Ltd.
Louisiana, Shreveport,
Woodward, Wight & Co., Ltd.
Maryland, Baltimore,
Cadd Tank & Specialty Co.
Massachusetts, Boston,
Waldo Bros. & Bond Co.
Massachusetts, Springfield,
Oscar F. Carlson
Massachusetts, Worcester,
Waldo Bros. & Bond Co.
Michigan, Detroit,
H. D. Edwards & Co.
Minnesota, Duluth,
Duluth Builders Supply Co.
Minnesota, Minneapolis,
Northern Machinery & Supply Co.
Missouri, Kansas City,
Union Material Co.
Missouri, St. Louis,
Hamilton-Buck Mfg. Co
Nebraska, Omaha,
American Machinery & Supply Co.
New Jersey, Atlantic City,
Oil Burner Service Co.
New York, Buffalo,
The Curtis Supply Co.
New York, Mohawk,
American Hard Wall Plaster Co.
New York, New York,
C. C. Phillips, 115 W. 24th St.
New York, Rochester,
American Clay & Cement Corp.
Wm. Summerhays & Son
New York, Rome,
American Hard Wall Plaster Co.
New York, Syracuse,
Paragon Plaster Co.
New York, Utica,
American Hard Wall Plaster Co.
North Carolina, Asheville,
Southern Steel & Cement Co.
North Carolina, Greensboro,
Odell Mill Supply Co.
Ohio, Cincinnati,
Wm. T. Johnston Co.
Ohio, Cleveland,
Cleveland Tool & Supply Co.
Ohio, Columbus,
Westwater Supply Co.
Ohio, Dayton,
Klinger-Dills Co.
Ohio, Toledo,
Hixon-Peterson Lumber Co.
Oklahoma, Tulsa,
Marshall Supply Co.
Oregon, Portland,
The Kline Specialty Co.
Pennsylvania, Bethlehem,
Morris Black
Pennsylvania, Erie,
O. C. Thayer & Son
Pennsylvania, Pittsburgh,
Pittsburgh Supply Co.
Pennsylvania, Reading,
Reading Foundry & Supply Co.
Rhode Island, Providence,
B. & H. Supply Co.
South Carolina, Columbia
Columbia Supply Co.
South Carolina, Spartanburg
Spartanburg Mill Supply Co.
Tennessee, Memphis,
Reed & Doorley
Tennessee, Nashville,
McCarthy-Jones & Allen Co., Inc.
Texas, Beaumont,
Norvell-Wilder Hardware Co.
Texas, Corpus Christi,
San Antonio Machine & Supply Co.
Texas, Dallas,
The Murray Co.
Texas, El Paso,
Geo. S. Thomson Co
Texas, Houston,
Norvell-Wilder Hardware Co.
Texas, San Antonio,
San Antonio Machine & Supply Co.
Texas, Waco,
San Antonio Machine & Supply Co.
Virginia, Norfolk,
Empire Machinery & Supply Corp.
Virginia, Richmond,
Southern Ry. Supply Co.
Washington, Seattle,
Cragin & Co.
Washington, Spokane,
Consolidated Supply Co.
West Virginia, Charleston,
So. Side Foundry & Machine Wks.
Wisconsin, Milwaukee,
W. H. Pipkorn Co.
Wisconsin, Superior,
The Spokane Company

Canadian Distributors

British Columbia, Vancouver,
B. C. Equipment Co., Ltd.
Manitoba, Winnipeg,
Walter Belyea & Co., Ltd.
Ontario, Hamilton,
Thomson-Gordon, Ltd.
Ontario, Port Arthur,
Wells & Emmerson
Ontario, Toronto,
J. H. Morrison
Quebec, Montreal,
Alex. Brosmer, Ltd.

Foreign Distributors

France, Paris,
Compagnie Technique Des Petroles
New Zealand, Auckland,
Wilton Furnace & Coal Co., Ltd.



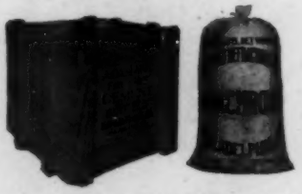
At the public utility gas plant in Bellefontaine, Ohio, ADAMANT Fire Brick Cement has been used over a period of seven years for laying up fire brick and for patching in gas generators, boiler settings and other fire brick construction. The Superintendent writes, "Through the use of ADAMANT, we have been able to prolong the life of our brickwork."

For Generator and Producer Repairs

Use the Super-Refractory

ADAMANT-ADACHROME Mixtures

Generator and producer linings, boiler settings and other fire brick construction last longer when you keep them in continuous good condition by frequent application of ADAMANT-ADACHROME surfacings, blown on with The ADAMANT Gun. ADAMANT - ADACHROME Mixtures are highly-refractory and unaffected by low - melting fluxes, abrasion and other destructive elements. Write for suggested mixtures for your conditions.



ADAMANT comes in 100 lb., 250 lb. and 400 lb. containers. ADACHROME is shipped dry in 125 lb. bags.

IN making repairs to generator and producer linings, you need materials that are chemically neutral and highly refractory, with adequate resistance to the destructive actions to which the brick-work is subjected, such as the severe scouring and corrosive action of clinker and ash, and the mechanical abuse incidental to the removal of clinkers.

ADAMANT - ADACHROME Mixtures are the Super-Refractories, ideal for patching and for surfacing applications, blown on by means of The ADAMANT Gun. These Mixtures, because of their chromite base, are chemically neutral and high in refractoriness. They have remarkable resistance to the action of low-melting fluxes or slags, clinkers, abrasion of descending fuel and other destructive elements.

If you are interested in refractories that will enable you to make more permanent and more satisfactory repairs, we shall be glad to suggest the proper ADAMANT-ADACHROME Mixture for your conditions. Write us.

BOTFIELD

REFRACTORIES CO.

Swanson and Clymer Streets,
Philadelphia, Pa.

For a Long Furnace Run, Use The ADAMANT *Gun*

ADAMANT

FIRE BRICK CEMENT

Whenever You Use a Fire Brick, Use ADAMANT, *the Original High Temperature Cement*

Upper Left—Watery ditch at West Fort William, Ontario, for Victaulic-coupled fire line.
Lower Right—How this Victaulic-coupled line looked before back-fill.
Center—Victaulic Couplings are preferred for oil field lines.

"For every joint on the line"
VICTAULIC COUPLINGS

The illustrations indicate the difficulties and the great expense for time and labor that laying this line with any kind of caulked, screw coupled or flanged joint would have entailed. So Victaulic Couplings were selected. The lengths were blocked up out of the mud and water until the Victaulic Couplings were bolted in place. Then the lengths were dropped down without injury to the joints. No special joint holes had to be excavated—no heavy expense for ditch damming and pumping. Not a Victaulic Coupling leaked when water at high pressure was turned into this line.

For time and labor costs and for lines that stay leak-proof, Victaulic Couplings set new standards. Unskilled labor can lay the lines. No special expansion joints or expansion bends are needed because each Victaulic Coupling takes care of the expansion and contraction of the pipe lengths it connects.

Victaulic Couplings are supplied for all sizes of steel, wrought iron and cast iron pipe from ¾ inch up—for all pressures from vacuum to ten tons per square inch. Victaulic Fittings make it easy to connect the line with any existing line.

VICTAULIC DISTRIBUTORS

Western
SMITH SEPARATOR COMPANY
Tulsa, Oklahoma

Pa. Md. and W. Va.
JOINER IRON WORKS
Clarksburg, W. Va.

Canadian
D. B. McWilliams
Toronto, Canada

Illinois, Indiana
BELL & GOSSETT
Chicago, Illinois

Minnesota, Wisconsin
F. S. VAN BERGEN
Minneapolis, Minnesota

Ohio
CASE HARDENING SERVICE COMPANY
Cleveland, Ohio

New England
EASTERN SERVICE COMPANY
Boston, Massachusetts

VICTAULIC COMPANY OF AMERICA
26 Broadway New York

The all-purpose couplings.

"For every joint on the line"

FLEXIBLE LEAK-PROOF
VICTAULIC
PIPE COUPLINGS

For list of uses and users and for detailed information fill in and mail the coupon.

VICTAULIC COMPANY OF AMERICA
26 Broadway New York

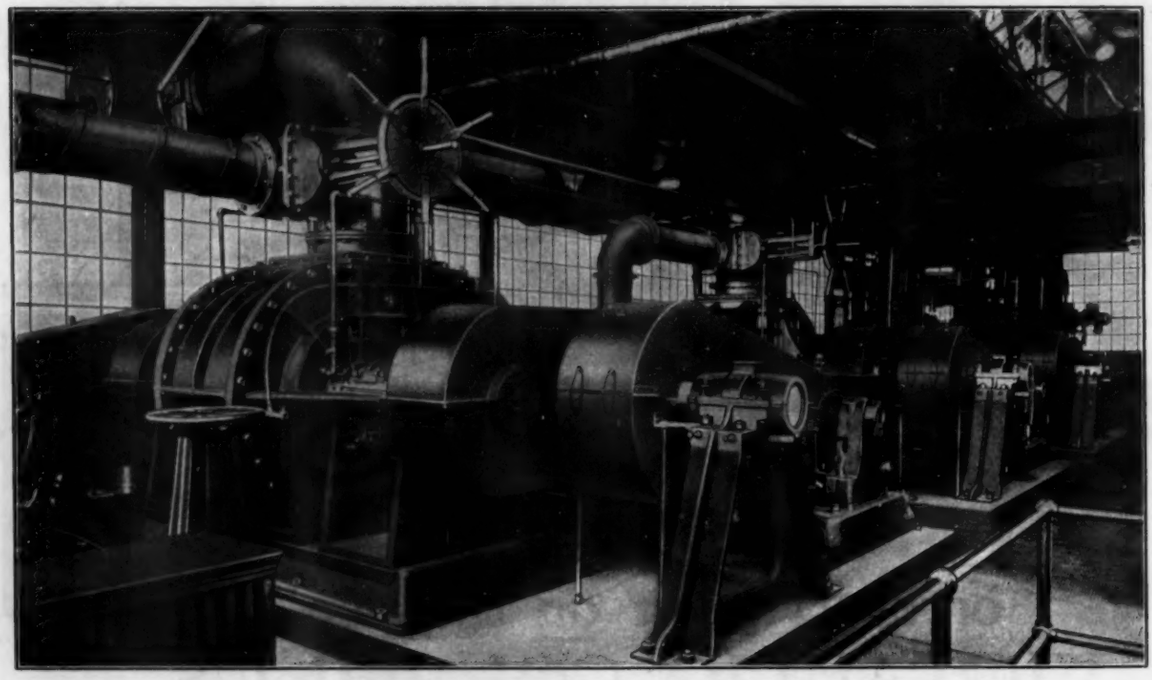
Please send Victaulic Bulletin No. 7.

Name .....

Address .....

FOR CRUDE OIL, GAS, WATER SEWAGE, COMPRESSED AIR, ETC.

ROOTS



Three Roots No. 11 Heavy Duty Gas Pumps each delivering 37 Cubic Feet per Revolution against 10 lbs. Pressure in Central West Plant.

Roots Service

Roots service is dependable, satisfactory service. From conception to the finished product every detail is carefully wrought and inspected.

Oversize shafts, heavily ribbed cases, adjustable self-oiling bearings, sturdy gears of *conventional* 14½° involute tooth design, exact clearances, and the absence of internal friction mean added service from Roots Gas Pumps.

Secure the best by specifying that it be a Roots product—regardless of whether you need a Gas Pump, Meter, Vacuum Pump, Liquid Pump, Blower, Gate, Valve or Coupling. Write for details.

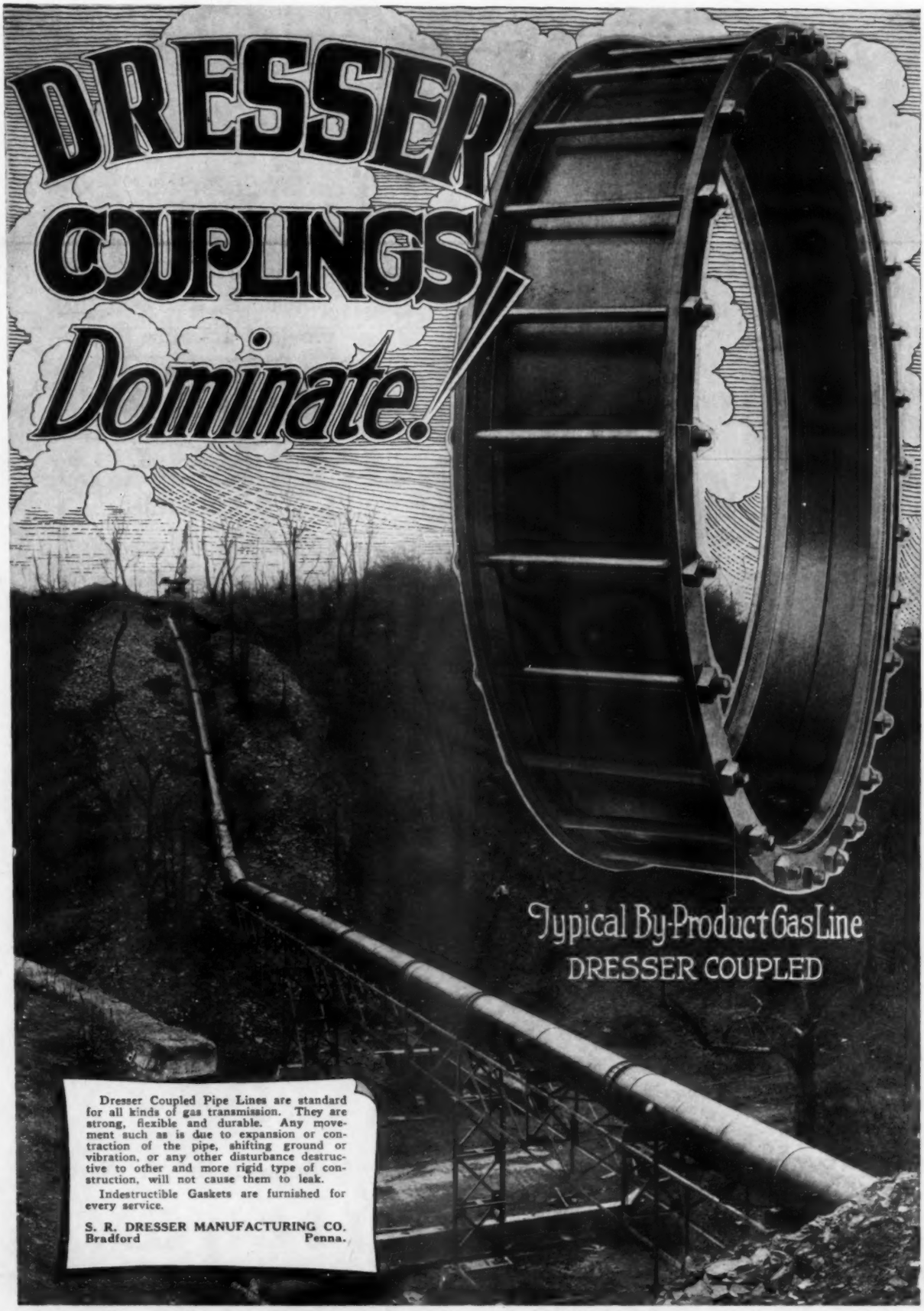
The P. H. & F. M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Originators of the Double Impeller Rotary Principle



Dresser Coupled Pipe Lines are standard for all kinds of gas transmission. They are strong, flexible and durable. Any movement such as is due to expansion or contraction of the pipe, shifting ground or vibration, or any other disturbance destructive to other and more rigid type of construction, will not cause them to leak.

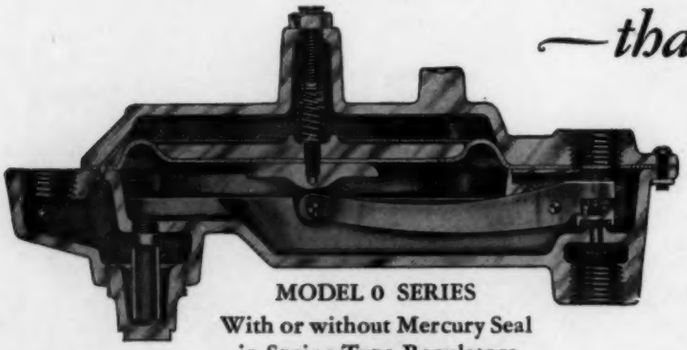
Indestructible Gaskets are furnished for every service.

S. R. DRESSER MANUFACTURING CO.
Bradford Penna.

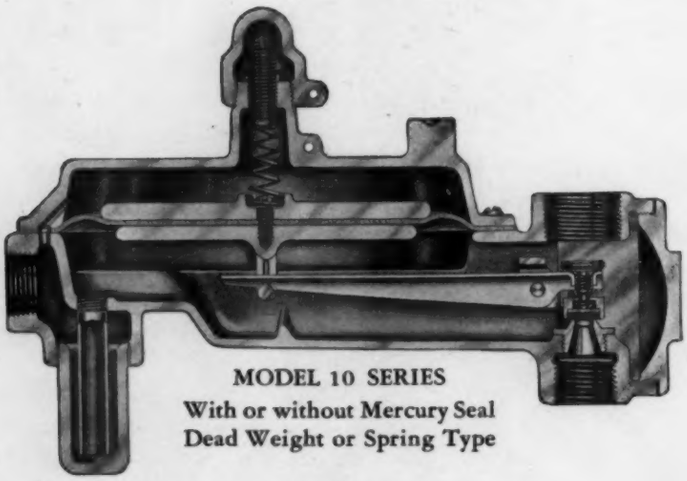
Reynolds

THREE SERVICE REGULATORS

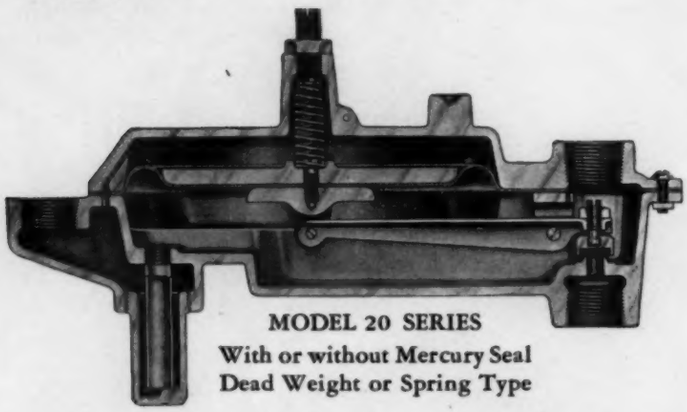
—*that answer every need*



MODEL 0 SERIES
With or without Mercury Seal
in Spring Type Regulators



MODEL 10 SERIES
With or without Mercury Seal
Dead Weight or Spring Type



MODEL 20 SERIES
With or without Mercury Seal
Dead Weight or Spring Type

To meet varying conditions and individual plant requirements, REYNOLDS has provided a Service Regulator to especially meet any and every requirement.

Reynolds Products

for all kinds of Pressure Reduction—for either artificial or natural gas.

Governors—

- Intermediate Pressure
- Triple Outlet
- Holder
- Toggle Type Street

Regulators—

- High Pressure Service
- Low Pressure Service
- Intermediate Pressure
- High Pressure Line
- Single and Double District Station

Valve—

- Automatic Quick-Closing
- Anti-Vacuum

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

REYNOLDS GAS REGULATOR CO., Anderson, Ind., U.S.A.

Representatives

Eastern Service Company, Boston, Mass. F. E. Newberry, Avon, N.J.
Thos. C. Corin, Detroit, Mich.

RECOGNIZED LEADERSHIP IN GAS CONTROL SINCE 1892

GAS TANK PROTECTION

APPLIED *with a* BRUSH

GAS TANK deterioration has been greatly retarded by the use of Aluminum Paint.

Aluminum Paint is water-proof and practically impervious to harmful fumes and gases—even those of hydrogen sulphide.

When applied to tanks and other outside gas plant equipment it forms a durable coat-of-metal which resists the destructive effects of sun, rain, wind and weather. It gives equally effective protection to steel, wood, brick or concrete.

Aluminum Paint keeps tanks cooler by reflecting instead of absorbing the sun's rays—saving much of the gas lost through the blow-off valves of pressure storage tanks and Hortonspheres in excessively warm weather.

Aluminum Paint is economical. It spreads farther and lasts longer than ordinary paints—yet costs no more. One coat hides any under color—even black.

The booklet, "Aluminum Paint, the Coat-of-Metal Protection," describes the unique "leafing" quality of this paint and contains information of value to every Gas Plant maintenance man. Write for it today.

ALBRON ALUMINUM ALUMINUM BRONZE POWDER
TRADE MARK

The pigment base for the better grades of Aluminum Paint is ALBRON made of pure ALCOA Aluminum.

In buying Aluminum Paint, tell your dealer how you propose to use it—and whether indoors or out. Most good paint dealers are prepared to furnish the kinds best suited to your needs. If yours is not, write us, giving his name and address, and we will see that he is supplied.

ALUMINUM COMPANY OF AMERICA
2412 Oliver Building, Pittsburgh, Pa.
Offices in 19 Principal American Cities

ALUMINUM IN EVERY COMMERCIAL FORM

THE COAT OF METAL PROTECTION

ALUMINUM PAINT

"IT LEAFS"

The BARTLETT HAYWARD CO.

Engineers and Founders

BALTIMORE and NEW YORK

DESIGNERS AND BUILDERS OF:

Carburetted Water Gas Plants
Complete Coal Gas Plants
By-Products Plants
Salt Water and Fresh Water Condensers
De Brouwer Charging and Discharging Machines
Purifiers - Steel Tanks - Shaving Scrubbers
Vertical Waste Heat Boilers
Gas Holders

View of Main Plant, Located at Baltimore

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900.

HENRY M. RILEY, *Editor*

The Public Ownership Question--Is It Open or Settled?

"IT IS THE FRUITION of the determined effort of organized business through these past ten years that Government shall not, under any specious pretense, enter the field of merchant marine competition. * * * There is no vestige left today of any demand of Government operation of railroads. There is no trace of public opinion which would ask our universal services of telephone and telegraph to be administered by bureaucracy. * * * There must be no encroachment by Government as competitor in any line of industry, for it produces the fear of extension to other lines of industry, which checks the confident developing of all industry."

This is the language of a former president of the Chamber of Commerce of the United States, who has given very careful thought to the problems of industry in their public relations. Not only from these remarks, but also from other portions of his address before a division of the American Bankers Association, one can conclude that Mr. Julius H. Barnes believes that the American people have too much good sense to be again drawn seriously into efforts of public ownership and public operation of business enterprises. The gas industry can take a great deal of comfort from this opinion, speaking nationally; but we must face the fact that there may still remain certain uneducated and unconvinced local groups of large influence who favor the public management of the gas business.

Under these circumstances the industry has an interesting question to consider. This question is one of expediency—is there greater benefit or harm from further propaganda against public ownership? Will such effort by the utilities of the country be taken to mean that they still regard the question of public ownership as a legitimate one for discussion? Or, will silence be interpreted as meaning that the utilities companies have withdrawn from the fight because they are scared off by such investigations as that which has been under way by the Federal Trade Commission under the instruction of the United States Senate?

The ablest men in the industry must face this issue squarely. They must seriously consider whether or not they are still keeping alive the public ownership issue by aggressive work opposing that idea. Sometimes when we have had a long fight in which the intangible public opinion is judge and jury, it is easy to carry on the fight too long through failure to appreciate when the battle has been won. It is important to determine whether at the present time such be the case with reference to the issue of public ownership of public utilities.

Filling the Summer Valleys in the Seasonal Load Curve

THE GAS INDUSTRY is approaching the time of idle plant equipment. It urgently needs summer sales opportunities in order to maintain output and provide for more rapid turn-over of invested capital. There are apparently only two important sources of such business—the year-around industrial load and the seasonal customer.

Already every enterprising company is putting forth mighty efforts to secure year-around business from desirable industrial customers. This is as it should be. However, the industry might as well face the fact that by lifting the load curve bodily, which is what we do when we get a year-around customer, we are not actually filling the summer valley. We are improving the ratio of summer sales to winter sales, but this is only half of the job.

It's hard to take but they'll like it

We need customers who can afford to buy gas from us for six to eight months in the year because they are given an attractive seasonal price. Every community includes such potential customers. The problem is to find them and to work out a rate that is mutually attractive. Some of that job should be done immediately. We need such customers in the year 1929; and if we are to have them the effort must be made NOW.

The Domestic Gas Problem

IN A RECENT DISCUSSION of the comparatively slow growth in domestic gas consumption a successful sales manager,—not connected with the gas industry—advanced a theory that a business depression would see an energetic rise in the output curve of gas for use essentially in the home. This idea, seemingly nonsensical at first, would appear to contain a grain of horse sense, at least, when amplified by explanation.

The above sales manager, starting with the generally accepted assumption that the American public is now enjoying the fruits of prosperity, reasoned that the saving of a few odd pennies here and there by "cutting corners" in the home is of scant interest to a great number of housewives and home managers. We of the gas industry realize full well the fact that the average woman would rather pay sixty cents a pound for a food item already cooked than expend forty for the same item in an uncooked state, and go to the trouble of subsequently preparing and cooking it in the home kitchen. She is backed by prosperous times in following such a procedure and there is present no economic pinch which would impel her to save fifteen or so pennies in this particular instance.

But, once let money tighten and prosperity sag and the fifteen or so pennies will mean something to her. Economic pressure will obviously force her kitchenward with more despatch than anything one can think of offhand. In turn, contended the sales manager, domestic gas consumption would necessarily increase.

We believe that this gentleman has ingeniously hit somewhere near the target but of a verity none of us are going to grovel on our knees each morning worshipping the god of hard times.

Nevertheless we must devote considerable thought and study to the domestic gas load. We cannot afford to let it slip from our grasp. Such brain efforts might accomplish the best results when centered in the Home Service Department. This necessary gas company institution must increasingly recruit to its ranks home economists of the very first water. Its personnel must be marshalled by executives who know a great many things about the whims and fancies of the home manager in her mode of living. The mere routine of telling the public how to bake a first rate porringer of beans will not suffice. Incidentally, this type of Home Service executive can command real remuneration. Let's secure and pay the price for Home Service Engineers who can unravel and later profitably apply the solution to such problems as to why the increase in domestic gas use does not keep step with the increase in population and the increase in the sale of kitchen utensils.

An Opportunity to Invest In Trained Gas Engineers

WHEN members of the Southern Gas Association made it possible for Johns Hopkins University to establish a professorship of gas engineering there may have been doubt in the minds of many as to just how such an undertaking would be worked out and as to how much useful result could be achieved for the industry. There remains today no such doubt, for the results have equalled the expectations of the most optimistic.

Under the circumstances there can be little doubt as to the importance of continuing this project. This is a question which will have to be met by executives in the Southern Gas Association area in the near future, for the agreement with the university expires at the end of the present college year and must be renewed or modified.

American Gas Journal hopes that there will be a decided modification of the undertaking in one particular —namely, an enlargement of the contributions so that even more good work can be done by this splendid institution. We bespeak on behalf of the industry as a whole a continued cooperation of those who contributed before and an extension of the work by larger contributions and by the participation of more companies. We need many more of the type of well trained men that are being produced through such specialized schooling. The industry will gain a hundred-fold in men capable of leadership for every dollar invested in such projects.

Including Convertible Features in New Utility Bonds

FINANCING of public utility companies under present stock-market conditions is not an easy task. The public is badly infected with the speculation bug and has lost interest in bonds and in those stocks which formerly were the backbone of the investment market. On the other hand securities with the speculative possibility of large appreciation are greatly in demand.

This speculative interest extends to convertible bonds, a fact which is one of large possible advantage to the executive who must refinance or secure new money for his company. Public utilities have not ordinarily authorized convertible bonds for financing, but at this time it is well worth while to consider that type of issue. It is not necessary that such bonds be convertible into the common stock without restriction. Often the conversion into high-yield preferred stock will suffice. And at times, the use of attached stock purchase warrants is sufficient as a bait for the investor.

There can be no safe generalization on so complicated a subject as utility finance. But it is safe to say that especially at this time it is important to have all the varieties of possibilities involved in financing carefully considered so that new money may be attracted even in the present difficult times, with a minimum of difficulty and at a minimum of interest rate. Competent bankers and investment houses are available to every executive to advise on the peculiarities of each local problem. They should be asked to consider all varieties of financing, including use of convertible issues, since for some cases these offer great promise.

Chain-Store Selling of Gas Appliances

CHAIN STORES have come to stay as a part of the retail merchandising system of the country. Hence it behooves every industry to study carefully the part which the chain store has, or should have, in selling its wares.

Selling of gas appliances has been extended to include even the ten-cent stores, where horrible examples of hot plates and dangerous flexible gas tubing have been found. No interest save that of the shyster manufacturer has been served by such sales. Nevertheless, there is a large place even for the ten-cent store merchandising method. There is still more important place for the chain hardware store, the chain drug store, and the chain department store in our scheme of appliance selling.

Suppose, for example, the best known chain of department stores could be persuaded to handle one of the best established lines of water heaters, or a first-class line of domestic ranges which is backed by a national advertising campaign. The manufacturer of such appliances would benefit greatly even though the quantity discount accorded such stores were somewhat higher than the discount given the small independent dealer. Sales managers of such appliance manufacturing companies could well afford to put a great deal of time and money into the job of building up such trade relations with chain stores of quality.

It is important to the entire industry that such effort be made. It is not right that Mrs. Jones be deprived of the best appliances and the best appliance service simply because she happens to inquire at her favorite department store or happens first to see an appliance which strikes her fancy in some other shop connected with a merchandising chain. The industry as a whole should bring that great merchandising group into the gas appliance family and assign to it the appropriate part of the appliance selling job.

Pipe Coating to Prevent Corrosion

Some Distribution Methods Used in California for Cleaning and Coating of Pipe to Minimize Corrosion Damage, as Presented by D. R. Hiskey

Lower Right—Portable Pipe Cleaner. Sand-blasting unit of Small size for convenient use on the job. This apparatus, which requires very little road space, can be used on the street for cleaning up those portions of pipe which cannot be cared for more conveniently in the pipe yard.

Middle Left—Hand Spreading of Tar Paint. This method is used where coating must be applied on the job. Note method of sling operation by the rear operator who drops the top of the sling close to the pipe to spread the paint over the top surface thoroughly.

Lower Center—A Hand Wrapping Job. Double wrapping of the pipe with muslin and use of five coats of paint gives protection for a line passing through bad alkali ground.

Upper Left—A Wrapped Weld. Note how the muslin wrapper shrinks close to the pipe, eliminating air pockets. The ridge about the center of the joint shows the location of the weld.

Lower Left—Sliding Main Under Services. The sling shown astride the ditch is used for sliding a line under service pipes in such a way as to prevent damage to the coating.

Courtesy Pacific Gas Ass'n

Installing High-Pressure Mains

Some Observations On the Factors Which Contribute to High Costs.

By G. Goodwin

THE following article is an endeavor to point out some reasons, as observed by the writer while engaged on gas line work, why costs are high. To properly illustrate and render clear the observations an imaginary job will be considered.

A newly formed gas company is assumed to be located in a suburban area where the houses are rather far apart and the district is growing rapidly. They have let a cost-plus contract to a large firm of engineers and contractors to install the mains, branch mains, valves, drips, governors, and such house piping as is the company's property. This firm has in turn let out three contracts, one to a local man to do the excavating, another to a welding contractor to do the welding and lowering of the pipe into the trenches, and a third contract to a local trucking firm to unload and distribute the pipe. The engineering, supervision and house piping is to be done by the engineering and contracting firm.

Cost-Plus Contracts

The client or gas company made its first error in letting the contract on a cost-plus basis. The efficiency of a straight contract job is much greater than that of cost-plus work. On the latter the personnel are not always chosen for their ability in the special work; they may have been with the company on other jobs and many would not be employed if the contract were straight contract work. A cost-plus job is often overloaded with employees; the firm likes to think that they are working as efficiently as if it were a straight contract, but they are "kidding" themselves.

The gas company in the above illustration erred again in allowing the engineering firm to sub-let the work. Such sub-letting is an acknowledgment of inability to work as efficiently as the sub-contractor.

To draw up a series of contracts to cover the above work is very difficult; only those who have had actual experience can do so properly. A contract should be an elastic one, as there are so many savable factors in the work; but the specifications should not consist merely of a number of platitudes. They should be exact, but brevity in a contract and specification is desirable.

Finding the Essentials

The essential of the job is to get a gas line free from leaks or obstructions in the pipes; a line that is graded properly to the drips; valves, drips, and governors installed where required; sufficient cover over the pipe; adequate provision made for all bridge crossings; and a set of accurate maps for all valves, drips, tees, governors, and house connections. In some localities the pipe must be coated and provision made for electrolysis prevention; and provision should be made for contraction and expansion of the pipe. These essentials are mainly checked by the engineers.

Estimate making, while an important matter, is not an essential one and cost data allure many superintendents and executives and seduce them away from the essentials. To keep down costs men must use all available energy on the essentials; and if the superintendent, office staff, and engineers are devoting too much time to the cost records and the making of comparisons with original estimates, the costs are sure to go up and the job to suffer.

Concentrating the Work

A well coordinated job is a concentrated one. There is a great tendency, especially with sub-contractors, to start excavating on streets widely scattered. This results in a large showing of half finished work. At first it impresses everyone, including the public, but as new streets are started before work on other streets is finished all sorts of troubles crop up. To properly look after the scattered work and to keep records and quantities, a staff of engineers two to three times as large as normally used is required. Transportation facilities are over taxed and mechanics are idle a considerable time going from one part of the job to another. A superintendent who concentrates the work can cut costs greatly. One who does not, invariably wastes money.

Excavation by machine is cheap and in some districts very desirable. In other places it is an expensive nuisance and a source of delay. Final hand grading of trenches is always required after ditching machines, except on good slopes. Tree roots and rocks interfere with their speed and they rip up many service, sewer, and water pipes. It is often impossible to locate such pipes in many towns as there are no accurate maps.

Acetylene Welding Superior

Acetylene welding in the writer's experience gives more satisfaction than the electric process. The pipes should be welded over the trench and should be lined up properly. Otherwise a series of small kinks will be formed in the line. Pipe up to five inches can be bent cold. To get around bends and obstructions a number of short bent pieces of different radius is desirable. These can be ordered with the pipe. Cutting and welding pipe to get around obstructions is undesirable as all contraction strains are concentrated at the welds and not distributed as they would be in a piece of curved pipe. Tees are more satisfactory than cutting into a pipe and welding a branch main to the line. Smoking the pipe to provide for contraction is important. In eighty miles of pipe that was smoked the writer has not seen one break due to contraction.

Where feasible, valves should be located on the sum-

mits and not near the drips. Any future repairs can then be made in dry places instead of in a mud hole. The installation cost on the summit often is 30 per cent less than near a drip where it is usually muddy.

Temporary Storage of Pipe

It is very unsatisfactory to have pipe distributed along the streets weeks before it is used. The coating suffers from the hot sun. Mud after rains runs into the pipe and later gets baked hard by the sun; and children place all sorts of rubbish into pipe while it is in the streets. Pipe left in the roadway instead of inside the curb is frequently damaged by heavy trucks. The ends are bent in and require cutting off, which causes an additional expense. The public find the pipe a nuisance and accidents occur by people tripping over it. Automobiles also may be damaged. The cost of lamping it when required is an added cost.

Courtesy, Portland Gas & Coke Co.

Ditching machine opening trench for installation of main pipe.

While it is desirable to have pipe arrive on the cars as required, enabling the trucks to distribute it a few thousand feet ahead of the excavation, it is practically impossible to get exactly such arrivals of pipe. Where possible, temporary storage at the freight yard is desirable. This storage may not always be required, but when surplus pipe arrives it is much better in temporary storage than subject to damage along the street. The added cost of storage and rehandling is not large, as only a part of the pipe is stored, the amount depending on the rate of arrival of the cars. This added cost is justified by the benefits derived from having undamaged pipe. The additional cost of cutting off bent ends, recoating pipe, and extra brushing out of the inside will often be more costly than the storage method.

In ordering pipe if one per cent is added to the measured distance of the line sufficient pipe will be received to provide for snaking (which is a very small extra length) and wastage due to cutting damaged ends, etc.

Personnel Problems

It pays to have reliable efficient men with a sense of loyalty to the firm. While good men can be hired cheaply, they expect to get ahead and a firm not advancing them loses them. This applies to all ratings. Good foremen can be hired at from $50 to $60 dollars a week. Others can be and are hired by firms at $45 a week. Engineers can be hired at $45 a week, but a *competent* engineer is easily worth $75.

A firm that saves a little on salaries loses out in results. It is apparent that a saving of from ten to thirty dollars a week can be made on salaries to engineers and foremen. This fact is likely to deceive an executive into the belief that he is doing work cheaply, while in reality the resulting costs are large. A foreman may control the output of say forty men. The work a competent foreman can get out of these men is of very much more value to the firm than a weekly saving of fifteen dollars in salary. The same applies, even more so, to engineers.

The superintendent's job is to manage the work, look ahead for difficulties, and keep the job as a whole running smoothly. He is valuable in that capacity on a large job. On a small job he may be of little value, as the job is not large enough to require much management and planning. As soon as he gets into details that should be handled by others the job suffers.

Speed and Costs

A schedule is desirable, but placing a limit on a week's output, for instance, is not desirable. One job had in its specifications a clause calling for a mile and a half a week. They easily got this amount and seemed satisfied. Almost double the rate could have been attained. The only limit to speed should be the requirements of good work. Fast work can be done well; and it is usually cheaper than slow work. Provide good management and a lot of loyal energy, and the job costs will be low.

Sixty men, including all employees, can complete about eleven hundred feet of five or six-inch welded pipe line per day. This includes all work from excavation to backfilling in ordinarily good digging, including welding and the placing of drips, valves, and governors. Such a job would require one superintendent, two engineers, two helpers, one excavation foreman, one pipe foreman, three welders, five mechanics, and the remainder laborers. After a job is well under way and the gang familiar with the work, a greater footage should be made in a day than the eleven hundred actually made.

Building Good Relations

The good will of the public is of value. It is not difficult to acquire it. A little care and extra cost will provide suitable crossings from garages, etc. The job should be well lamped and real watchmen employed.

Courtesy, Linde Air Products Co.

Backfilling machine in operation.

The fire department, police department, tree wardens, and those locally in charge of sewers and water works, telephone and other companies having underground wires, are people who will cooperate or do the reverse,

depending on how they are treated. It is a simple matter to consult them before ripping up a street and certainly worth while.

Courtesy, Linde Air Products Co.
Men protected by gas masks while digging through old garbage dump.

It is desirable to open up a considerable distance in advance of pipe laying. This enables unforeseen obstructions to be taken care of in time. Obstacles such as railway tracks and paved roads that require uninterrupted service are best tunnelled under. The gas pipe if laid in tile pipe of larger diameter can be replaced if necessary without digging up the road a second time.

The writer knows of two jobs similar in nearly every way. Both were done by the same firm, but the costs on one were fully thirty per cent higher than on the other. On the job with the low costs the essentials were always in view. On the other job considerable energy and effort were lost in useless details and in adjusting costs.

Below are a number of reasons why such job costs are higher:

1. Lack of good management and cooperation.
2. Lack of efficient staff.
3. The presence of sub-contractors on the job.
4. Last-minute changes in plans by the client.
5. Lack of necessary transportation for engineers, foremen, and mechanics.
6. Work scattered over several streets instead of being concentrated.
7. Friction on the job with sub-contractors or clients representatives.
8. Permitting any one on the job to do work that is not his own.

Courtesy, Portland Gas & Coke Co.
Oxy-acetylene welding of steel gas main.

9. A "penny wise and pound foolish" policy of the superintendent or firm.
10. And the most important:—The failure to concentrate on the essentials of the job.

HOW TO WELD WROUGHT IRON PIPE

DUE to its distinctive method of production, genuine wrought iron has properties that are quite different in many respects from low carbon or mild steel, with which it is sometimes confused.

During the finishing operations slag is distributed throughout the metal, and as a result, genuine wrought iron has a fibrous structure which distinguishes it from steel.

The general technique for oxwelding wrought iron pipe is quite similar to that for welding steel pipe. Such slight modifications as are necessary are due almost entirely to the fact that wrought iron contains a certain amount of slag. No change is necessary in preparing the pipe ends for welding, in lining up or in method of making rolling or position welds.

A puddle of molten metal should always be maintained at the point where rod is being added, the end of the rod being kept immersed in this molten puddle until enough metal has been deposited. Then the edges of the molten puddle and the surrounding colder metal should be fused together to obtain a solid union. The weld progresses by repetition of this procedure, care being taken to add no metal from the welding rod except through the vehicle of the molten puddle. In order to obtain sound weld metal free from oxide which produces low strength and porosity, the molten puddle should be disturbed as little as possible. Excessive rubbing or agitating of the molten pool should be avoided as this causes undue exposure of the molten metal to the atmosphere, resulting in the formation of oxide which is frequently trapped in the weld.

With reasonable care during the welding operation, impurities can be easily floated to the surface. Undue agitation of the puddle may also result in molten metal being spread out over un-fused surfaces causing laps or other defects in the weld.

In welding wrought iron for the first time, the slag may tend to mislead the welder as to the fusion of the metal. The slag is distributed throughout the metal and is more easily fusible than the iron. Accordingly when the blowpipe flame is applied to the surface of wrought iron the slag melts first, giving the appearance of fusion before the metal has actually melted. Once recognized, this condition is easily avoided by simply making certain that the sides of the vee are actually fused before adding weld metal. It should be remembered that wrought iron can stand higher heat without damage than other ferrous materials.—*Oxy-Acetylene Tips.*

Coal and Coke Breakage and Segregation

Effect on Plant Operation and Gas Cost Preventative Method by Adams Patented Process

By E. G. Blackwell

Eaton-Kent, Inc., Newark, N. J.

WITH the development of industrial uses of gas and the house heating load the Gas Industry has entered definitely into a highly competitive field in the general supply of heat, and economies in plant operation and overhead costs have grown increasingly important. Indicative of the efforts to effect reductions in the ultimate cost of gas, which the industry offers as a better means of heat supply than coal, oil and electricity, are such modern innovations as Waste Heat Boilers, Mechanical Producers, Automatic Controls, Self-Clinkering Grates, Dry Quenching of Coke and other apparatus, all increasing plant investment but justifying their installation by the monetary returns they make.

A modern gas plant is becoming a very highly organized factory where all sources of waste are eliminated, and where that constancy of operating conditions is being reached that is necessary to a state of highest efficiency.

The present article discusses means that will assist general economies by the prevention of coal and coke breakage and counteracting segregation.

Discussing first the subject of coal as the raw material in coal gas operation and coal or coke as that in the case of water-gas operation, it may be stated that breakage and segregation will affect the efficiency of plant operation and the overhead and capital charges factor in the gas cost.

Coal Gas Plants

In a coal gas plant, whether of the intermittent or continuous type, the highest daily output of gas and consequently the lowest overhead cost per M. ft. can only be attained where operating conditions are constant.

Consider first a continuous vertical retort plant. Here we have a plant in which all operating factors are constant except the coal fed to it. Due to segregation of coal sizes in the coal shed or overhead bins the retorts are fed with coal containing at one period a high percentage of nut coal, and at another period coal containing a high percentage of fines.

One result is that when the coal is fine the heat penetration into the retort suffers and it becomes necessary to slow up the throughput of coal by adjustment of the coke extractor, and to make such adjustments to steam admission as may be necessary to maintain the desired gas calorific value. Thus the day's output from the plant is reduced and it is by no means uncommon to find a reduction of 10% in the day's make. As the general overhead (including capital charges on the whole of the works' structures) is constant in total amount, the cost per unit of the lesser quantity of gas produced will be increased.

Simple calculation shows that for every ten cents of overhead charges based on the higher possible output, the increases in these charges for a ten per cent reduction of output amounts 1.11 cents per M. ft. Thus on a plant of a nominal daily capacity of 5,000,000 cu. ft. the increased cost in making only 4,500,000 cu. ft. amounts to $50.00 for each day it occurs for every ten cents of nominal overhead and capital charges per M. ft.

Other results are disturbance of bench heats, increased labor costs per M. ft. and probably an inconstancy in coke and tar quality. Where the output has to be made up with gas costing more to make, the loss is still further increased.

The continuous vertical retort plant is remarkably

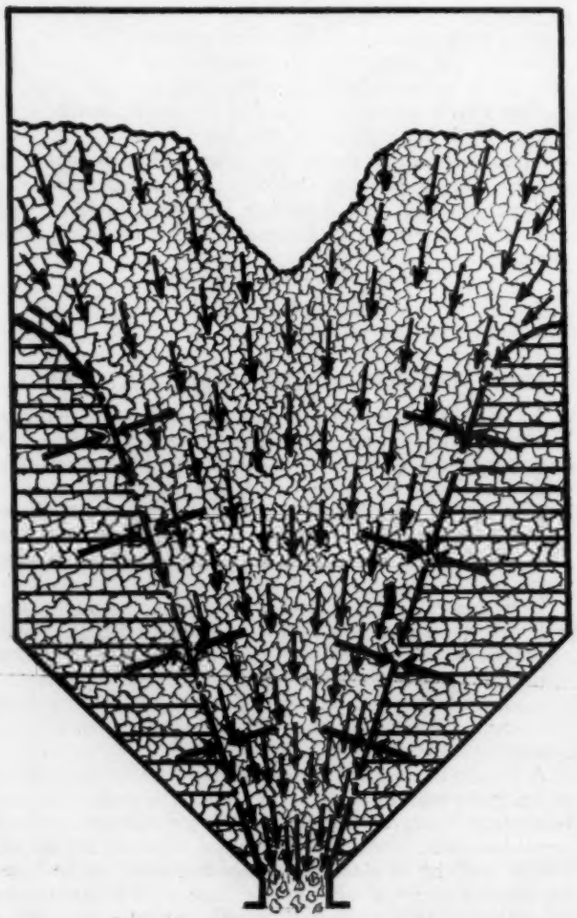


Fig. 1. Ordinary Bin Discharge.

flexible in operation, and apart from the money loss in feeding it with varying coal mixtures it would appear to be of definite operating value to overcome this one variable factor.

In the case of horizontal or vertical intermittent retort plants operating on a fixed time schedule, variations in coal mixtures will result in varying weights of retort charges in addition to varying heat penetration.

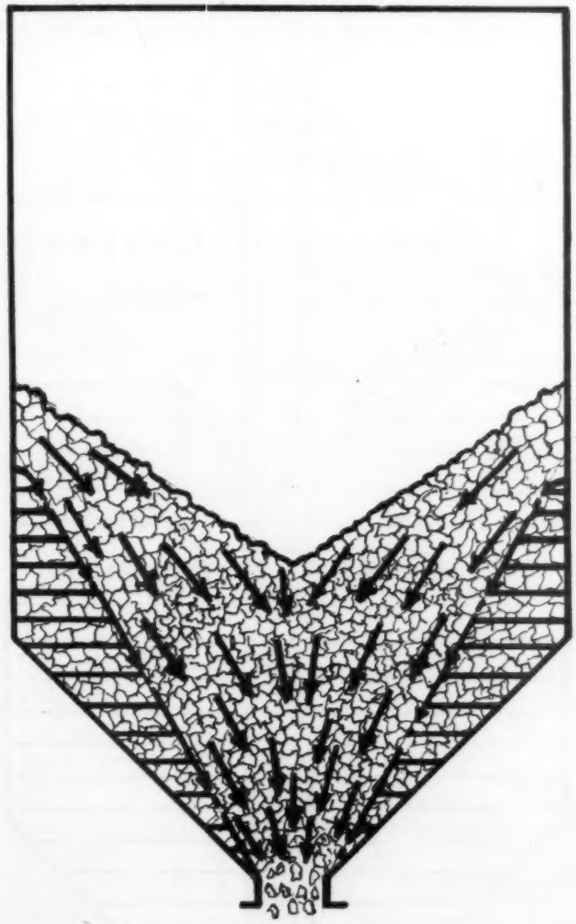


Fig. 2. Ordinary bin with coke withdrawn to a low level.

While the total effect on the daily gas output may not be so marked as in the case of the continuous system, losses in gas output per ton of coal will occur, the quality of coke may be more greatly affected, and the effect upon bench fuel consumption and on the calorific value of gas more noticeable.

Water-Gas Plants

In Water-Gas plants operating with coke the effects of segregation are overcome as far as operating conditions are concerned by screening out the breeze, and the main loss is that due to the lesser value of the breeze as boiler fuel compared to its original value as large coke. It should be pointed out however that there is no objection to the use of a reasonable amount of breeze in the water-gas generator providing that it is intimately mixed with the main body of coke, and that if this is accomplished the full coke value of the breeze is retained.

So far coke has been considered only as a raw material of gas manufacture. Where it is a sales product in the Gas Company's operations the losses due to breakage are directly due to the decreased values of the breeze and smaller sizes formed, while a perhaps less tangible loss is that due to the increased sales resistance to coke, the appearance of which has suffered by general size degradation which occurs inevitably in ordinary bin discharge.

As in the case of anthracite, coke must be carefully sized and be free from dust. It should be free from any large proportion of undersize, and particularly should care be exercised to prevent sending out to customers occasional loads of coke containing very little of the size ordered. One of the difficulties experienced in selling coke is the claim that it is not easy to control its combustion in domestic furnaces. That difficulty is certainly not lessened if the mixtures of sizes supplied varies greatly with successive deliveries.

Once put into sales bins it is very desirable also to maintain the structural strength of the coke in order that a minimum of breakage may occur when loading into trucks or delivering into customers' storage.

Ordinary Progress of Coke

Let us now examine what occurs in the usual method of filling and withdrawal from bins. Fig. 1. shows a bin of coke from which a load is being withdrawn, and Fig. 2. the same bin with the coke withdrawn to a lower level. The coke contents will include a range of sizes between the higher limit of the screen mesh through which it has passed and the lower limit of the mesh size of the screen preceding. It will also contain some smaller sizes either caused in transit or carried over the smaller mesh screen. Also in falling into the bin smalls will have been formed by direct breakage as the coke drops on to the plate bottom of the bin or on to the coke already in the bin. A natural partial segregation of sizes will have occurred, the larger lumps rolling to the outer edges, the fines remaining in the center and the intermediate sizes resting between.

As soon as the bottom grate is opened the whole body of coke tends to drop, but due to the restricted outlet the actual shape of the descending body assumes a conical wedge formation extending from the perimeter of the outlet gate roughly to the perimeter of the upper surface, as indicated in the sketches. If this wedge were solid no actual movement could take place, excepting so far that its weight would cause it to jamb tightly into the tapered conical hole of the outer coke mass. What occurs is that the mass of material shown horizontally shaded is compressed tightly against the bin sides, being retained at an angle far exceeding its natural repose angle, while the closely packed but not solid mass of coke forming the inner wedge descends turbulently under its own weight and at varying velocities to the outlet. This inner wedge may be considered as a series of conical wedges fitting one within the other. Those nearer the center of the bin have steeper side angles and have consequently a freer downward movement, and thus gradual sinking at the center of the surface is observable as a vortex action when one looks down into a bin as discharge is taking place. From the foregoing it will be seen that the fines and smaller sizes will be first to reach the outlet, and it will not be until the central sinking at the upper surface is pronounced that the larger lumps will be free to mix in the discharge.

It will be noted also that as the bin empties the sides of the wedges assume a flatter angle, counteracting the increased freedom of movement which follows the

lessening of the compression in the coke masses as the weight of the descending coke grows smaller. This changing of the wedge angle has a particular significance when one considers in detail what is taking place at the surface of each wedge formation. See Fig. 3.

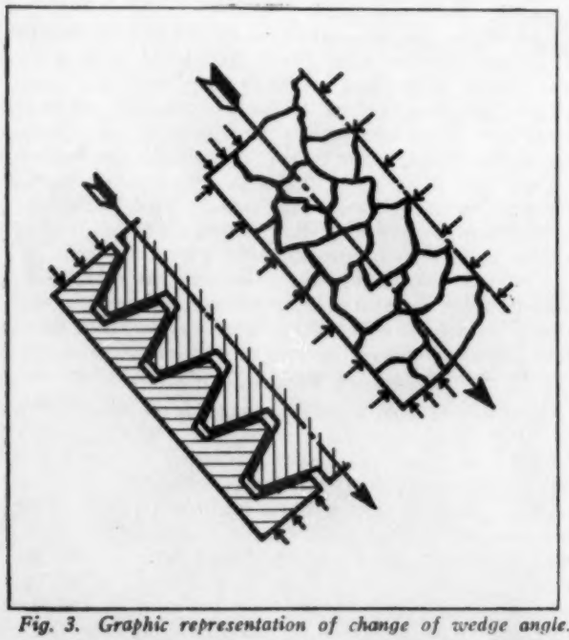


Fig. 3. Graphic representation of change of wedge angle.

If the lumps of coke were perfectly smooth and rounded there would be very little restriction to its descent. As, however, they are far from smooth we have a line of interlocking pieces resembling two racks gearing one with the other, while the downward force is trying to shear through the pieces along the general line of cleavage. The engaging lumps are held together by the compression in the outer retained coke and the less solid descending mass. The only possible movement is by either shear of the coke or by rearrangement of individual pieces to permit a smooth surface being formed. Both actions take place. Wherever there is a weakness in the coke structure the lump breaks into smaller pieces and breeze, and the stronger pieces turn upon themselves with a grinding action as they are forced into the adjacent bodies.

This action is occurring not only at the engaging surfaces of the descending and retained masses, but throughout the former. Also as the bin empties and the wedge angle changes the action is continuous until the bin is completely empty. It should be noted that the coke discharged will be in a weakened structural condition. Incipient cracks will be enlarged and the probability of further breakage before reaching the customer is apparent. It will be further noted that this breaking and grinding action is more pronounced amongst the larger lumps nearer the bin walls.

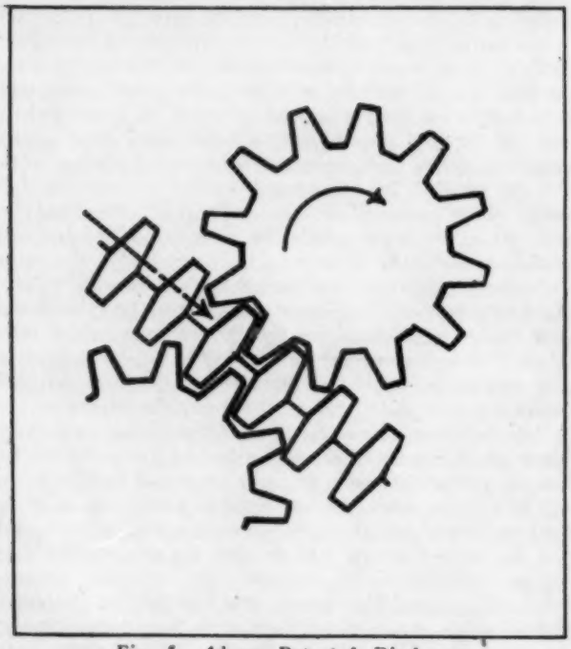


Fig. 5. Adams Patented Discharge.

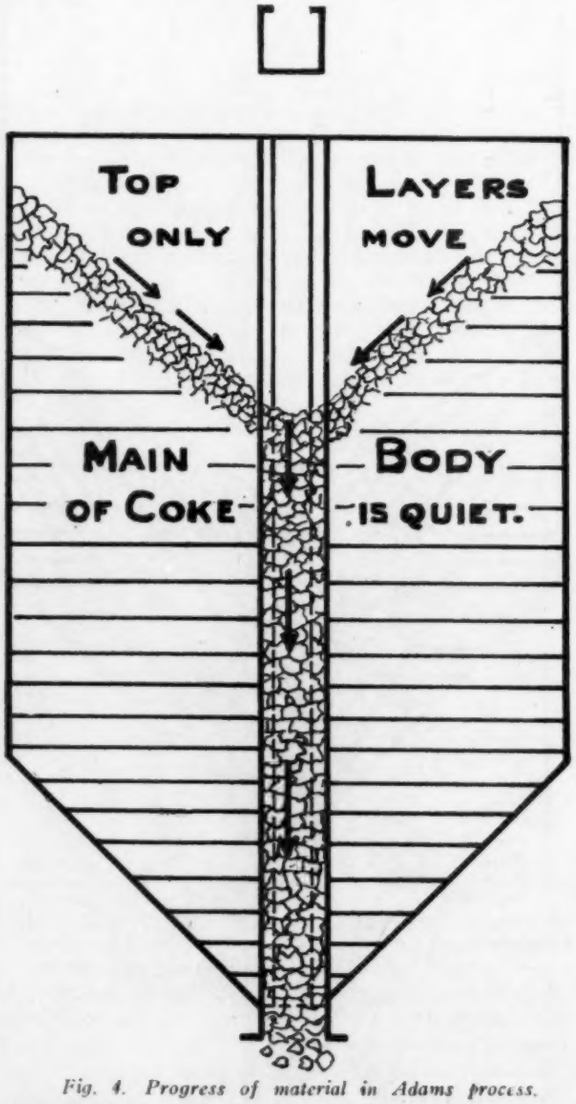


Fig. 4. Progress of material in Adams process.

The Adams Process has been designed to overcome these inherent defects in ordinary bin discharge. See Fig. 4. For bin discharge the Process consists in its

simplest form of a vertical rectangular chute extending upwards from the bin gate to the upper surface of the bin, the chute having one open side as shown.

In operation the pressure of the coke causes a light arch to form across the slot opening, the arch breaking readily at the coke surface where the pressure is insufficient to retain it. As the outlet gate is opened the column of coke in the chute descends, and fresh coke immediately follows from the upper surface. The material in the chute sinks in an orderly manner without turbulence, while that flowing into it from the coke surface rolls or slides at the natural angle of repose.

There is no movement of the main body of the material and it can be seen that there is an automatic reassembling of sizes as the larger lumps at the outer edges move towards the chute carrying forward the smaller sizes with them. Instead of the shearing and grinding action illustrated in Fig. 3. the Adams Process substitutes a free movement as shown in Fig. 4.

Thermal Insulation of Gas Consuming Appliances

Saving of 10 to 50 Per Cent. in Gas Consumption

TO any gas consuming apparatus a definite and limited amount of heat is supplied by the burning gas. In very few cases do we receive back the full equivalent of this heat supplied. The difference may be accounted as waste, but this waste is in two forms—(1) waste during conversion to the form of energy output required; and (2) waste after conversion and before the energy is applied to the purpose in view.

For instance, in a heat-operated refrigerator several heat units must be supplied in practice in order to extract one heat unit from the cabinet, that is, to give one unit of cold. Some wastage in conversion is unavoidable. Any subsequent wastage of the cold produced is therefore doubly wasteful, since the cold has already cost several times its equivalent in the original heat required to produce it. Steps must be, and are, taken to conserve the cold, and refrigerator cabinets are invariably covered with a layer of non-conducting material often several inches thick. The provision of this material is a capital charge which may very soon be written off against the saving in fuel costs; though in the apparatus in question it is even doubtful whether any effective cooling inside the cabinet would take place in the absence of the lagging protection.

Hot Water Installations

Lagging on domestic hot water supply installations is comparatively rarely used, even when long lengths of exposed flow and return pipe are reducing the efficiency to a very low figure. Some considerable care is taken in boiler design to ensure extraction of the maximum amount of heat from the burning gas, but the extracted heat is thereafter allowed to escape freely from the water to the room. Even with high boiler efficiency every heat unit lost from the water represents nearly one-and-a-half units produced by the burning gas, so that avoidance of this source of waste is not only technically simple, but is automatically magnified in terms of fuel economy. It may be suggested that this heat loss serves a useful purpose in also warming the house, but, as with most double purpose tools, the two requirements are not coincident. In winter the desire for room comfort may lead to running the hot water installation when no hot water is required, while house warming in summer whenever hot water is desired may often be unseasonable.

Choice of Materials

The insulation requirements for domestic use will necessarily be searching, and no known material fulfils all the conditions perfectly. The following qualities must be taken into account:—(*a*) Thermal insulating properties. (*b*) Thermal capacity (should be low in view of intermittent type of usage). (*c*) Resistance to repeated heating and cooling for temperature range from about 40° Fahr. to 160° Fahr. (If near flue pipe a higher maximum temperature may be reached.) (*d*) Mechanical strength. (*e*) Resistance to corrosion or insect attack. (*f*) Sanitary and without smell. (*g*) Easy, clean, and quick to apply. (If applied during manufacture this is of less importance.) (*h*) Suitable for application to curved or irregular surfaces. (*j*) Easy removal for boiler cleaning, repairs, or during cold weather, when heat from set is required to warm the surroundings. (*k*) Reasonably fire resistant. (*l*) Cost, and alternative sources of supply.

The familiar lagging materials fall into four classes:—(1) Cements (e.g., Leroy). Probably the commonest form of material used for lagging. The proper application is specialized work, and usually two visits to the premises will be required in order that drying may take place before the finish is applied. (2) Rigid lagging (e.g., cork composition, cellular asbestos). Except for the simplest shapes this will require special manufacture. (3) Flexible lagging (e.g., felt). In general this will require an external wrapper to hold it in position. The question of insect attack or harbourage requires special attention. (4) Granular or fibrous material (e.g., cork chips, cotton wool). An external rigid jacket is essential

The choice of material will necessarily depend upon whether the lagging is to be applied during manufacture, or is for the protection of existing installations. The

Abstract of a paper, "Thermal Insulation, with Especial Reference to Domestic Hot Water Supply Installations," by C. A. Masterman, read before the London and Southern District Junior Gas Assn. at the Westminster Technical Institute, Jan. 25, 1929. Courtesy, Gas World, London, Eng.

latter represents the more difficult type of case, and attention has been concentrated upon it.

Experimental Results

A number of possible lagging materials were chosen, and preliminary trials were made with small canisters containing hot water. The less suitable materials were thus eliminated, and some information for purposes of comparisons was obtained as regards others for which full-size tests were impossible. An asbestos cement, asbestos millboard, cellular asbestos, and hair felt were chosen for full-scale trials on boilers and hot water installations. Full information was obtained about the set when unlagged, and its subsequent behaviour after lagging was observed, and with all other factors kept constant so far as possible. The boiler of the set was run until the contained water approached maximum temperature (i.e., when thermostat shut down). Immediate drawing off to cold with evaluation of the heat content of the water gives, with the heat value of the gas burned a ratio which determines the nominal boiler efficiency. The same routine was repeated, allowing various periods of time to elapse between turning off the gas and drawing off the water. In each case a figure may be calculated corresponding to the nominal boiler efficiency, the value clearly being the lower the greater the delay before drawing down. Then working backwards from this nominal efficiency figure it is possible to calculate what the heat content of the water would be at these stated times after a standard amount of gas has been consumed.

Fig. 1 shows graphically for an unlagged set a number of such points. The nearest theoretically derived cooling curve to these points is then drawn in as shown, and this curve is used for subsequent calculations. This same figure shows a number of other cooling curves for the same set under various degrees of lagging. The effect of lagging thickness is clear, as is also the contrast between the several lagging materials.

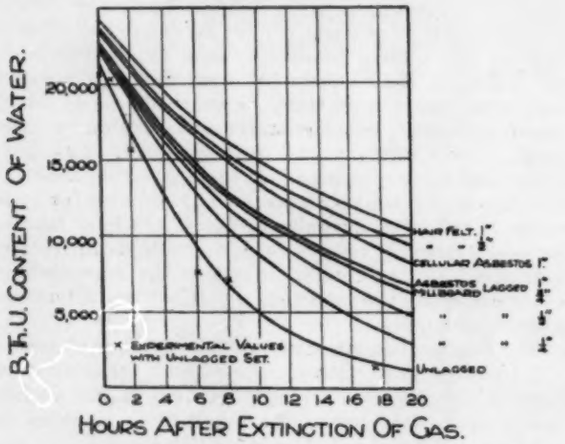


Fig. 1. Change in Heat Content of Water with Lapse of Time after Extinction of Gas.

Fig. 2 shows similar curves derived from a different set, and the effect of different finishes upon the thermal insulation is very apparent. This effect, however, would certainly be less if applied to lagging of a higher degree of efficiency.

Question of Cost

As regards cost, on a 20-gallon set the saving in gas will be about 65 c. ft. daily, which, with gas at 9d. per therm (C.V. 500), will represent about 6s. a month. This would meet the cost of the lagging long before the first year had expired. In studying the experimental results referred to, the correct balance between capacity of the set and the demands to be met is seen to be economically important. A set of excessive capacity will give a low overall thermal efficiency, while if of inadequate capacity, it will deliver at inadequate temperature rise for maximum demand, though the overall thermal efficiency will be high. Estimates are based upon a set of a rated capacity corresponding roughly to the maximum total demand (normally) falling within any period equal to the time required to heat up from cold.

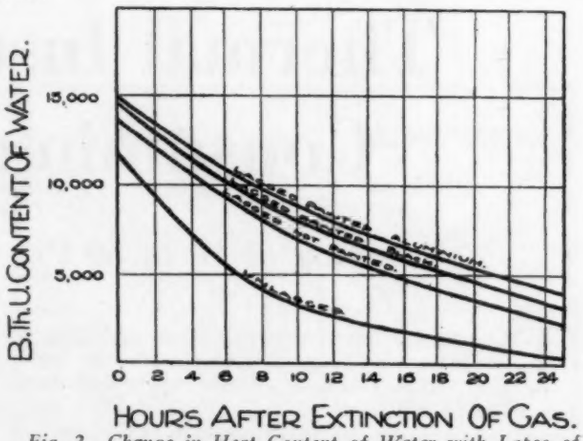


Fig. 2. Change in Heat Content of Water with Lapse of Time after Extinction of Gas showing effect of Finish

Lagging 1 in. Asbestos Cement

Clearly from the results obtained and on common-sense grounds the greatest proportionate saving due to lagging will occur during periods when the water is hot and is maintained hot at a comparatively low gas rate. While the practice with an unlagged set is somewhat extravagant, when the set is lagged the gas may be kept continuously alight with the advantage of hot water being constantly available. The gas rate then corresponds roughly to the gas rate on the same set unlagged, run with the utmost care and economy, and lighted only exactly to fulfill demands. When gas is turned out in the interests of economy the heating surface in the boiler firebox becomes a cooling surface. Tests show that if air circulation through this space is then prevented the heat losses during the stand-by period are reduced by about 10 per cent. on an unlagged and 25 per cent. on a lagged set, the normal losses in this way naturally being slightly higher the greater the pull induced by the flue pipe equipment.

Lagging During Manufacture

Attention has chiefly been concentrated upon the application of lagging to existing installations. In such cases the possibility of lagging to such a degree that the minimum gas rate is in excess of the maintenance rate has been mentioned. When boilers are designed originally to receive insulation, such a danger should not arise, since the heating may then be done by a luminous burner, or a special gas cut-out may be arranged to accommodate the great reduction in gas rate required. Whatever the means adopted for the cutting down of the gas when the required water temperature has been reached, it is desirable that full gas rate should be continued as far as possible up to this point. This abrupt thermostatic action has the advantage of diminishing the period necessary for

heating up, and so lessening the capacity of set which will be required to accommodate a given demand.

Fig. 4 shows how the gas rate diminishes as the heating up progresses in a number of boilers, and the contrast in action of the different types of thermostat is very evident. On hot water sets lagged during manufacture a granular or fibrous material is generally used as a packing inside an outer sheet metal jacket. A high degree of insulation is easily achieved. An interesting development which becomes possible under these conditions is a reduction in the maximum gas rate to an amount at which the provision of flue pipe equipment is unnecessary (e.g., 10 c. ft. per hour).

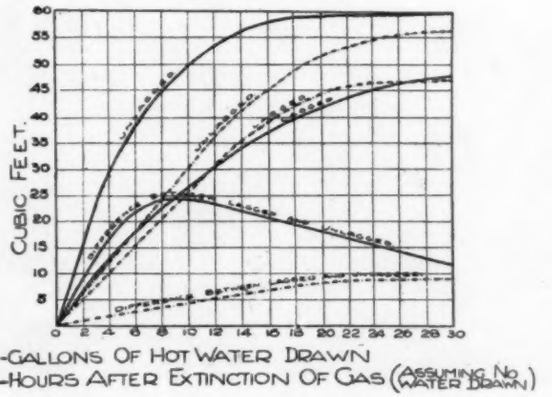


Fig. 3. Amount of Gas (C.V. 500) required at 60 c. ft. per hour to Re-establish Maximum Water Temperature after Cooling and Drawing-off Water (Set A). Lagging 1 in. Cellular Asbestos.

The gas is continuously alight, and if full gas rate is small the heatng up period is proportionally increased. Hence, for the same demand as for a boiler of higher gas rate, the capacity must be greater. Abrupt thermostatic action is for the same reason desirable. When a heavy demand has been made on such a set it will be some hours before such a demand can again be met, but domestic routine can usually be arranged to accommodate this disadvantage. Avoidance of mixing between the cold inlet water and hot contents is, therefore, especially important in this type of set. Installation charges will be less than with an ordinary set owing to the low gas rate and lack of flue equipment, while the constant availability of hot water (subject to the above proviso regarding heavy demands) is an obvious convenience. The overall efficiency of such low consumption sets is not less than that obtained in the more familiar higher consumption lagged sets, and will normally be much higher than that obtainable with an unlagged installation. The whole of the heat losses contribute to the warming of the house.

Sets lagged during manufacture will usually be self-contained units, and in many cases the boiler and storage are actually combined into one. In these circumstances the hot water tank is not available for warming an airing cupboard, but the deficiency may be made good by more convenient and more economical substitutes. The room in which the boiler set is placed will also require some other apparatus for warming it in cold weather, but there will often be no reason why this should not take the form of a radiator on the return between storage and boiler, so arranged that it may be short circuited when not required.

Summary

1. The merits of thermal insulation in respect of domestic hot water supply installations are only slowly being appreciated.

2. Thermal insulation is of two kinds: Lagging, which reduces heat loss to the air and indirectly loss by radiation; and finish, which reduces the latter only. The effect of the latter, though appreciable, will normally be secondary.

3. The overall efficiency of an unlagged hot water installation on household usage will normally be only between 1/3 and 2/3 of the nominal test efficiency. With a moderate degree of lagging this contrast between nominal and real efficiency is halved.

4. The gas saved in consequence of moderate lagging will never be less than 10 per cent., and may exceed 50 per cent.

5. A convenient and suitable form of lagging for application to existing installations is suggested in the use of ½ in. treated hair felt attached inside a canvas duck jacket arranged for lacing into position.

6. A simple mathematical expression is advanced for forecasting the gas saving to be anticipated from such lagging on any set and under any reasonable conditions of usage.

7. The cost of the application of lagging will soon be repaid by the saving in gas, usually within the first year after application.

8. Excessive lagging on a set not designed to receive it may in certain circumstances lead to overheating of the water, and excessive scale formation will result, even though boiling point is not actually reached. In such cases partial lagging may be used to reduce excessive heat losses.

9. Heat losses may also be reduced appreciably by preventing air flow through the firebox while gas is not alight, but adequate lagging allows gas economically to be alight the whole time, and results in the convenience of an ever available supply of hot water. (Overall efficiency will then roughly correspond to that on an unlagged set manipulated for demand with the utmost care and economy.)

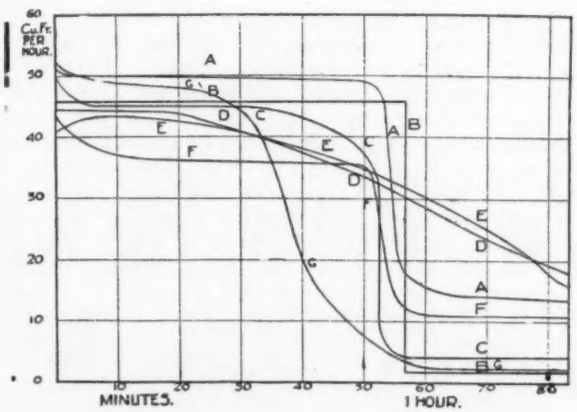


Fig. 4. Gas Rate during Heating of Lagging Boilers.

10. The capacity of the set should be suitable for the demands to be made upon it. Maximum demand during any period corresponding to the time required to heat up from cold should not greatly exceed the rated capacity of the set; but, where mixing of the cold inlet water with the hot contents is successfully avoided, two-thirds of this capacity may give satisfactory service. Abrupt action of the thermostat will reduce the time required to heat up from cold, and will, therefore, enable a smaller

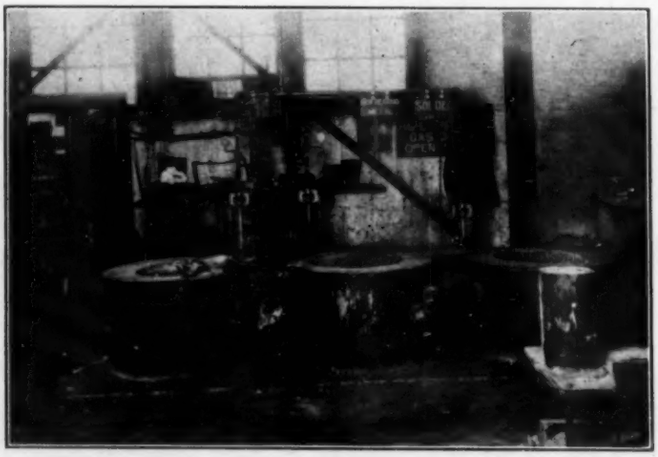
capacity set to be used for the same demand.

11. An adequately lagged set may be efficiently run with a maximum gas rate so small that flue pipe equipment is unnecessary; the gas then being maintained alight continuously under thermostatic control.

12. Where lagged hot water installations are in use some provision must be made for keeping the room warm in cold weather. An independent supply of heat for the airing cupboard may also be necessary. The conventional use of the hot water supply installation to fulfill these unrelated requirements can never be more than an inconvenient compromise.

Railroad Shops Adopt Gas After Exhaustive Test

By E. E. Pierson



Gas installation on soft metal pots in Chicago & Alton Shops.

EXHAUSTIVE experiments conducted for more than a year in the shops of the Chicago & Alton at Bloomington, Illinois, have convinced the management that gas has met the requirements of furnishing economical and efficient heating service and has points of superiority over fuel oils and solid fuel previously utilized.

In submitting the proposition to the management of the railroad it was necessary to demonstrate that gas could be used more economically than in the case of fuel oil, coke, or coal, and that practically all the costs of operation, accruing in the use of such fuel, could be eliminated with the substitution of gas. The survey for the tests was conducted by F. L. Banner, industrial fuel engineer for the Union Gas Company, and he has been in charge of the temporary installation and the permanent, just authorized, when it was possible to convince the officials of the saving in cost of production.

Demurring to a suggestion that a compressor be installed, due to the heavy expense, and before it was proven that the substitution of gas would be all that it was claimed for it, the Chicago & Alton management agreed to the rigging of an air pump from a locomotive as a makeshift compressor and this has answered admirably for the purpose.

It is now the conclusion of C. M. House, superintendent of motive power for the railroad, that the use of gas will increase efficiency, reduce operating expenses several thousand dollars annually, lessen the fire hazard, and improve working conditions for employes. Following the tests, the company has signed a contract calling for the installation of a complete high pressure gas system.

Up to 15 years ago, coal and coke were largely used on the various shop heating operations. About 1913, the company substituted crude oil for most of the heating operations. The latest development is the adoption of gas, all buildings where heating operations are in vogue, are being supplied with high pressure gas connections and necessary apparatus installed as rapidly as possible, while the company has authorized the purchase of a compressor, capable of supplying 30,000 cubic feet of gas per hour. Although this will be larger than required for present needs, it was reasoned that within the next few years, the use of gas heating will be extended to other operations, when the full capacity will ultimately be needed.

Of major importance in the list of operations in which gas will be used, is the manufacture and heat treatment of high speed steel tools. Discussing this operation, Supt. House expressed himself as follows: "In the heat treating of high speed steel with gas, we are assured of precision control, imperative if uniform quality work is expected. Gas fired furnaces are automatically controlled and hold a constant temperature, ensuring cleanliness, simplicity and economy."

The tool operation calls for the installation of two, double deck, high speed steel furnaces, two oven-furnaces, two oil tempering furnaces, and two pot hardening furnaces. While the bare fuel costs in this case will be slightly greater with gas than other fuels, the advantages to be gained in efficiency and in other directions are regarded by the Alton management as far outweighing the slight variance in cost.

Another operation which will represent a considerable portion of the total consumption to be gained, is in rivet heating. In commenting upon this department, Supt. House said: "We have decided to install gas fired rivet heaters in our boiler shop, tank shop, coach shop, and steel car shops. A test conducted with the

gas fired rivet heaters, showed a considerable saving in time, and a much cleaner and better product, not to mention the elimination of the annoying roar produced by the oil fired forges."

A large number of comparative tests were run on the gas, coke, and oil fired rivet forges. In addition to the labor required for refilling the oil tanks for the oil fired forges, it was found that they required new lining about every nine months. A gas forge on the same job, it was found, will operate for a year or more without re-lining, and this replacement costs much less than on the oil forge. On the coke forges, it was necessary to break the fuel into small pieces before it could be utilized. This required additional labor which was directly charged against the cost of this fuel.

It was also found by the tests that rivets produced by the gas forge showed much less scale. The operation of soft metal melting was formerly performed with coal fuel. With gas the heat was obtained in about one half of the time required when the former was used, while a better product was obtained, due to exact control of the temperature through the use of spuds and inspirators regulating the flow of gas and the introduction of air.

Following the initial installation of two rivet heaters, the company has ordered ten more which will be portable and can be moved to the various shops as required.

The company has also ordered a number of gas fired forges and pre-heating furnaces for the blacksmith shop, and there will also be connections to furnish heat used in burning off the paint from passenger train equipment and in heating the japanning ovens, replacing steam used in the past.

The Chicago & Alton management has been investigating the results of experiments in gas in various other extensive railway shops and which authorized extensive installation of gas heating machines when it developed that gas was the most economical fuel.

Gas-fired rivet heater in Chicago & Alton Shops.

In summing up the installation of gas machines, Supt. C. M. House stated: "With the new heat treating equipment in the Bloomington shops, we expect to save considerable time on this operation and also materially increase the life of our machine tools."

Gas lines are being extended to all departments of the shop plant and as rapidly as possible the various machines will be connected and placed in operation. By early summer, the complete installation upon the present contract, will be completed.

CIVILIZATION SHOULD PROVIDE SAFETY SAYS NOTED N. Y. ENGINEER

The Safety movement has long since outgrown the pioneer stage. The period of the blazed trail has passed and the time has come when for effective use it must be widened into a highway and be connected by cross roads, into the general scheme. The responsibility is ours if we permit accidents to determine the course of the Safety movement in this day and age.

Such is the opinion of Charles P. Tolman, prominent consulting engineer of New York City, voiced at a recent meeting of the Metropolitan Chapter of the American Society of Safety Engineers.

The speaker pointed out that Safety is not a separate activity to be tacked on to other affairs, or carried on parallel with them. On the contrary, freedom from "unintentional" injury to persons is a normal concomitant of civilized living. The thought and actions needed to secure this "safeness" are an integral part of any operation in which a hazard exists.

The fact that we do have accidents, according to Mr. Tolman, does not vitiate the logic—it simply proves that we are not yet entirely civilized.

The tired man produces less, makes more mistakes and is more likely to be injured. The fatigue may be physical, optical or mental. All three elements should be scientifically checked.

Proper illumination is the answer to the problem of continued acuity of vision. It must be right or trouble is certain to develop sooner or later. Production has been known to increase ten percent with the correction of illumination defects.

Every exposed hazard of any description diverts the operator's attention and slows him down. Continued mindfulness of such hazard produces needless mental fatigue which reduces the worker's production rate and also the accuracy of his work. Personal injury claims due to unguarded hazards amount to much less in dollars and cents than the steady drain on production for which they are responsible.

Proper working conditions are also extremely important, according to Mr. Tolman.

"If we insist that what we have been calling 'safety' be included as an integral part of the whole and work from that viewpoint, accident prevention activities will gain new strength and I believe the statistics will tell a new story," he concluded.

Selling Industrial Gas

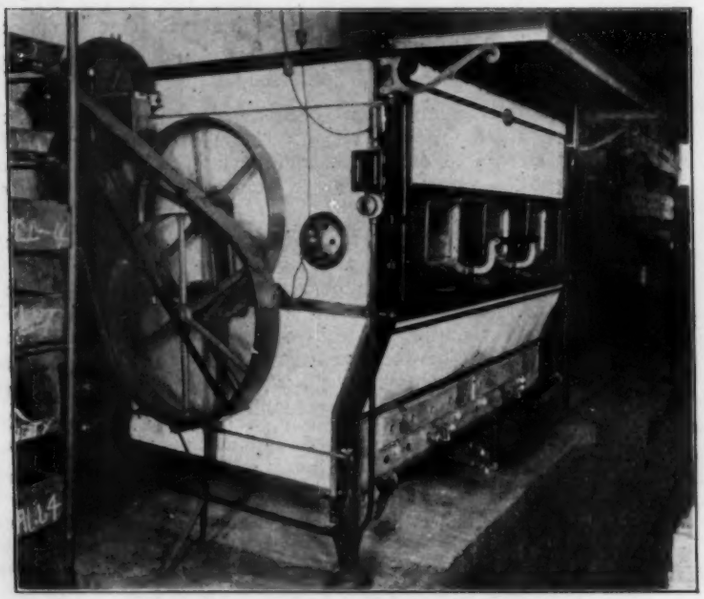
Gas, The Ideal Fuel for Exact Temperature Control

IT is axiomatic that gas is the superior fuel for purposes where the temperature must be maintained within very narrow limits. A heating operation of this sort is not predicated so much upon the actual cost involved as upon the ease and convenience with which the regulation of the temperature is accomplished. The gas man can generally succeed in introducing gaseous fuel for such a purpose irrespective of the difference in expense involved, although it is also possible to effect indirect savings which reduce the cost of using gaseous fuel. The main point is that gas is the more convenient fuel, the one that can be more closely controlled, which naturally infers that the quality of the product, all other conditions remaining constant, is better, and spoilage is less.

Such an application of gaseous fuel is that in the plant of the Baker Brush Co. This company makes all kinds of paint and varnish brushes, an essential operation in the manufacture of which is the drying of the boiled or washed hair. This must be carried out between certain temperature limits, if the hair is to be properly dried and not overheated and injured. Gas has been found to be the ideal fuel for this purpose.

However, there is another application of gas in this plant which is perhaps of greater importance in that the brush ends must be firmly fixed to the ferrule. A rubber composition in solution is used as the binding agent and the rubber must be vulcanized. This requires heat. The operaton is carried out in a Crandall Pettee oven, as shown in the accompanying illustration. This apparatus will handle from 100 to 800 dozen brushes at a time, depending upon their size, and the time of vulcanization varies between eight to nine hours. The process consists first in the evaporation of the solvent and then in the vulcanization of the rubber. If the rubber is under-vulcanized or over-vulcanized, the hair will not remain permanently fixed.

Gas has been found to be excellent for this purpose, for it is very easily controlled. It gives a uniform heat. It is cleaner and less hazardous than oil fuel for example. It possesses the great advantage of flexibility, for by simply turning the gas cock, the fuel supply is shut off and heating ends. It is cheaper than electricity.



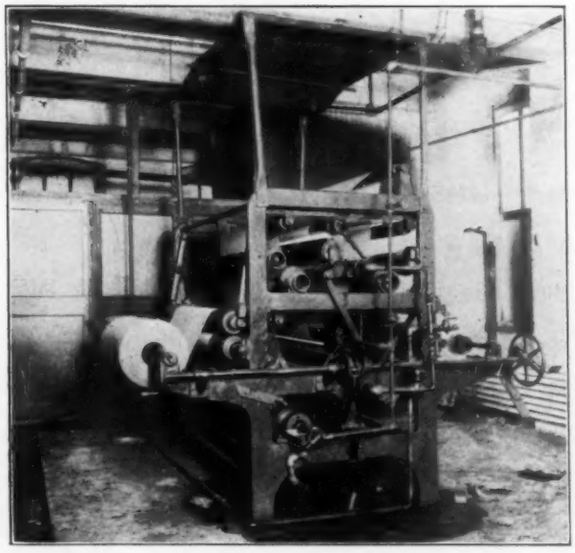
Brush vulcanizing oven.

Singeing Fabrics by Gas

FABRICS, whether cotton or silk, whether they are to be dyed, finished or printed, must receive a preliminary treatment to remove the fuzz, loose threads and the like which lay on the surface. Furthermore, this must be effected uniformly over the entire surface of the fabric.

Gas has been found to be the only reliable fuel for this purpose. There may still be found in certain calico printing plants and others the old coal furnace provided with a copper plate which is heated red hot and over which the fabric is passed. However, this is a crude way of burning off the fuzz. Besides the dirt and trouble of firing the furnace and danger that the fabric may become soiled or burnt, there is the additional difficulty incurred in the use of the coal furnace of irregularity of the removal of the fuzz. Furthermore, what is really required is not heat but flame, and gas amply meets this requirement.

The accompanying illustration shows an installation of a silk singeing machine in the plant of Kaufman Brothers in New York City, where silks are dyed, printed and finished. High pressure burner equipment of the Ensign-Reynolds type, is used in this apparatus. The burner is not of the slotted type used in machines that process cotton fabric in the same manner but contains a series of small apertures through which the gas burns. The gas singeing machine entirely removes the fuzz, leaves a clean surface which can be properly finished, dyed or printed, is economical to operate and needs but little attention. Silks which are treated in this manner can be finished uniformly so that their luster and gloss are perfect. Generally one passage through the machine is all that is necessary, but where heavy fabrics are being singed, the operation may be repeated once or twice. There are two gas flames, one burning off the fuzz on the right side of the fabric and the other similarly treating the wrong side.



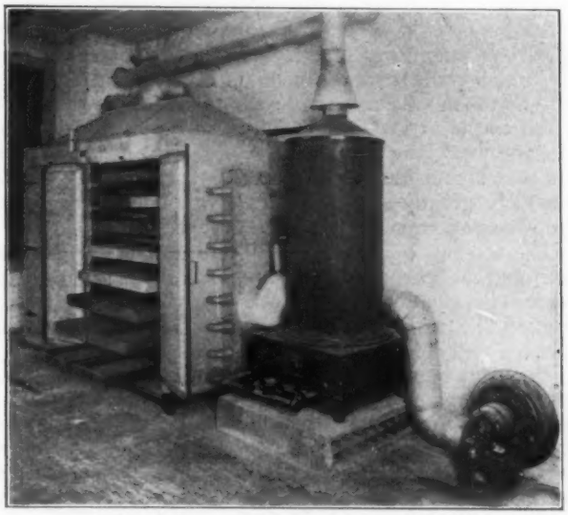
Silk Singeing machines.

Drying and Sterilizing by Means of Gas

DRYING and sterilizing are two important industrial operations of a thermal character which are used particularly in food plants. Gas has been found to be very well adapted for this purpose, much more so than the ordinary industrial fuels. An interesting example of such an application is found in the plant of the Lust Health Food Bakery of New York City, where a special "health food" is manufactured.

The accompanying illustration shows a specially designed dryer which is heated by means of a gas-fired Schmitt Air Heater. The blower, shown at the right of the illustration, forces air through the heater, where the moisture is taken out of it and the temperature is raised. The air is then introduced into the dryer which is composed of two compartments, one of whose doors stand open, and in which are arranged a series of trays containing the material to be dried. The air enters the header at the right side of the dryer and is distributed therefrom by means of pipes which lead it over each tier of trays. At the top of the dryer is located a ventilator outlet which is controlled by means of a damper and through which the evaporated water is removed in vapor form. The extent to which the damper is open depends upon the amount of water in the material being dried.

This apparatus will dry 500 pounds of product, such as peanuts, almonds, bran, etc., in six hours and the amount of gas used during that period amounts to about 650 cubic feet.



Drying and Sterilizing oven.

It is very important that the moisture be removed from the ingredients before they are used, for moisture tends to favor the spoilage of the food. Before gas was used in this plant, a special room heated by steam coils was provided. The process was very slow, for it took six days to effect proper drying. Now the gas heated dryer handles 500 pounds of nuts, etc., in six hours. The drying operation is more uniform and the cost is actually less. In addition, time is saved, a better grade product is turned out, and space is conserved.

A. G. A. CONVENTION IN OCTOBER TO BE ADEQUATELY HOUSED

The new Atlantic City Auditorium where the A. G. A. Convention will be held in October has just been completed at a cost of $13,000,000. Seating capacity on the principal floor alone is 41,000. On its main exposition floor, according to Lincoln G. Dickey, General Manager of the Auditorium, Madison Square Garden could be set down in its entirety, and two football games, a track meet and several meetings might be staged concurrently in the remaining area. It is a floor of some two-and-a-half acres extent, with a ceiling 130 feet above. It contains the world's largest stage.

The Atlantic City Auditorium, according to Mr. Dickey, is the largest building of its kind in the world.

The structural steel used weighs 12,000,000 tons. The building required 42,000 cubic yards of concrete, 65,000 barrels of cement, 23,000 tons of sand, 53,000 tons of mixing stone, 2,000,000 square feet of concrete forms. Some 10,000,000 bricks were set, and more than 200,000 tons of sand were removed in laying the foundation, the piles of which—36,000 cubic feet in all—extend 50 feet below low-tide level. Mr. Dickey stated that approximately 150,000 persons could comfortably be accommodated in the entire building.

The Auditorium organ is operated from two giant consoles, each with six manuels affording a total of some 1,000 stops, and is lifted and lowered from the orchestra pit by special mechanisms. Its 32,000 pipes, some of which are 64 feet long, give it a wind pressure twice that available in the Liverpool Cathedral, where hitherto the most powerful organ in the world has been housed. A powerful amplifying mechanism makes it possible to hear a whisper from end to end of the main floor roughly 500 feet long.

Selling Industrial Gas

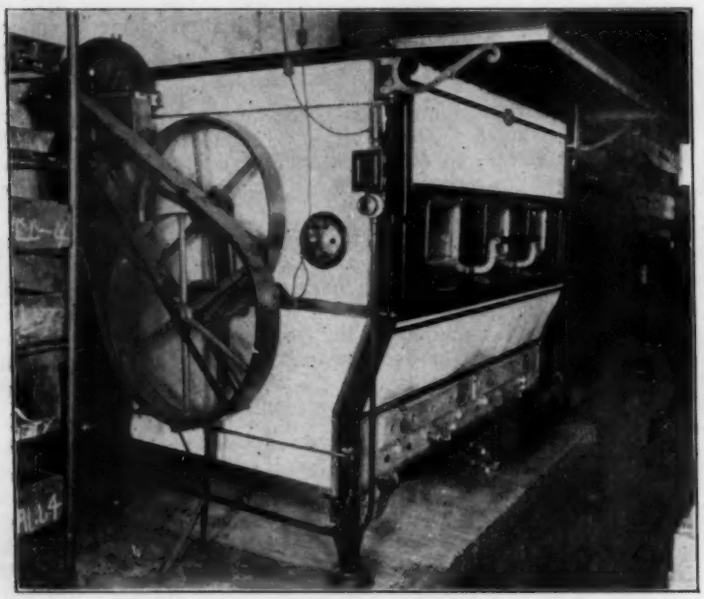
Gas, The Ideal Fuel for Exact Temperature Control

IT is axiomatic that gas is the superior fuel for purposes where the temperature must be maintained within very narrow limits. A heating operation of this sort is not predicated so much upon the actual cost involved as upon the ease and convenience with which the regulation of the temperature is accomplished. The gas man can generally succeed in introducing gaseous fuel for such a purpose irrespective of the difference in expense involved, although it is also possible to effect indirect savings which reduce the cost of using gaseous fuel. The main point is that gas is the more convenient fuel, the one that can be more closely controlled, which naturally infers that the quality of the product, all other conditions remaining constant, is better, and spoilage is less.

Such an application of gaseous fuel is that in the plant of the Baker Brush Co. This company makes all kinds of paint and varnish brushes, an essential operation in the manufacture of which is the drying of the boiled or washed hair. This must be carried out between certain temperature limits, if the hair is to be properly dried and not overheated and injured. Gas has been found to be the ideal fuel for this purpose.

However, there is another application of gas in this plant which is perhaps of greater importance in that the brush ends must be firmly fixed to the ferrule. A rubber composition in solution is used as the binding agent and the rubber must be vulcanized. This requires heat. The operaton is carried out in a Crandall Pettee oven, as shown in the accompanying illustration. This apparatus will handle from 100 to 800 dozen brushes at a time, depending upon their size, and the time of vulcanization varies between eight to nine hours. The process consists first in the evaporation of the solvent and then in the vulcanization of the rubber. If the rubber is under-vulcanized or over-vulcanized, the hair will not remain permanently fixed.

Gas has been found to be excellent for this purpose, for it is very easily controlled. It gives a uniform heat. It is cleaner and less hazardous than oil fuel for example. It possesses the great advantage of flexibility, for by simply turning the gas cock, the fuel supply is shut off and heating ends. It is cheaper than electricity.



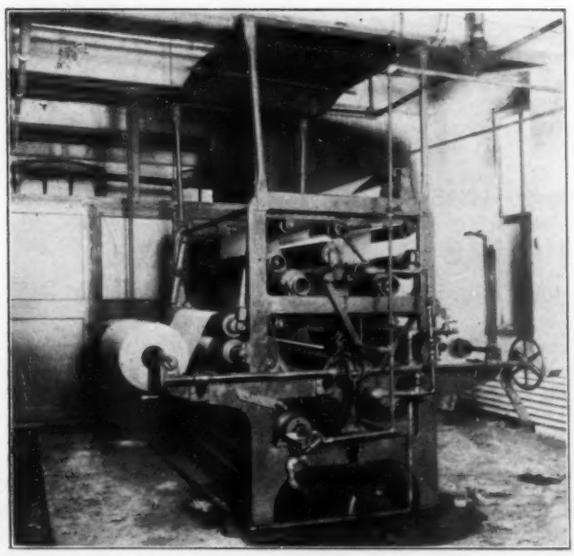
Brush vulcanizing oven.

Singeing Fabrics by Gas

FABRICS, whether cotton or silk, whether they are to be dyed, finished or printed, must receive a preliminary treatment to remove the fuzz, loose threads and the like which lay on the surface. Furthermore, this must be effected uniformly over the entire surface of the fabric.

Gas has been found to be the only reliable fuel for this purpose. There may still be found in certain calico printing plants and others the old coal furnace provided with a copper plate which is heated red hot and over which the fabric is passed. However, this is a crude way of burning off the fuzz. Besides the dirt and trouble of firing the furnace and danger that the fabric may become soiled or burnt, there is the additional difficulty incurred in the use of the coal furnace of irregularity of the removal of the fuzz. Furthermore, what is really required is not heat but flame, and gas amply meets this requirement.

The accompanying illustration shows an installation of a silk singeing machine in the plant of Kaufman Brothers in New York City, where silks are dyed, printed and finished. High pressure burner equipment of the Ensign-Reynolds type, is used in this apparatus. The burner is not of the slotted type used in machines that process cotton fabric in the same manner but contains a series of small apertures through which the gas burns. The gas singeing machine entirely removes the fuzz, leaves a clean surface which can be properly finished, dyed or printed, is economical to operate and needs but little attention. Silks which are treated in this manner can be finished uniformly so that their luster and gloss are perfect. Generally one passage through the machine is all that is necessary, but where heavy fabrics are being singed, the operation may be repeated once or twice. There are two gas flames, one burning off the fuzz on the right side of the fabric and the other similarly treating the wrong side.



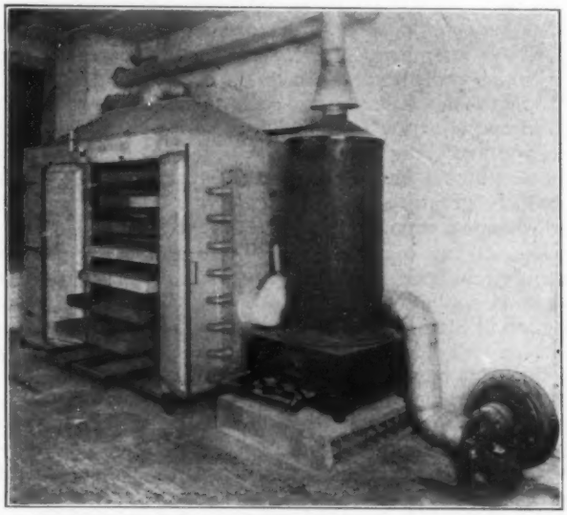
Silk Singeing machines.

Drying and Sterilizing by Means of Gas

DRYING and sterilizing are two important industrial operations of a thermal character which are used particularly in food plants. Gas has been found to be very well adapted for this purpose, much more so than the ordinary industrial fuels. An interesting example of such an application is found in the plant of the Lust Health Food Bakery of New York City, where a special "health food" is manufactured.

The accompanying illustration shows a specially designed dryer which is heated by means of a gas-fired Schmitt Air Heater. The blower, shown at the right of the illustration, forces air through the heater, where the moisture is taken out of it and the temperature is raised. The air is then introduced into the dryer which is composed of two compartments, one of whose doors stand open, and in which are arranged a series of trays containing the material to be dried. The air enters the header at the right side of the dryer and is distributed therefrom by means of pipes which lead it over each tier of trays. At the top of the dryer is located a ventilator outlet which is controlled by means of a damper and through which the evaporated water is removed in vapor form. The extent to which the damper is open depends upon the amount of water in the material being dried.

This apparatus will dry 500 pounds of product, such as peanuts, almonds, bran, etc., in six hours and the amount of gas used during that period amounts to about 650 cubic feet.



Drying and Sterilizing oven.

It is very important that the moisture be removed from the ingredients before they are used, for moisture tends to favor the spoilage of the food. Before gas was used in this plant, a special room heated by steam coils was provided. The process was very slow, for it took six days to effect proper drying. Now the gas heated dryer handles 500 pounds of nuts, etc., in six hours. The drying operation is more uniform and the cost is actually less. In addition, time is saved, a better grade product is turned out, and space is conserved.

A. G. A. CONVENTION IN OCTOBER TO BE ADEQUATELY HOUSED

The new Atlantic City Auditorium where the A. G. A. Convention will be held in October has just been completed at a cost of $13,000,000. Seating capacity on the principal floor alone is 41,000. On its main exposition floor, according to Lincoln G. Dickey, General Manager of the Auditorium, Madison Square Garden could be set down in its entirety, and two football games, a track meet and several meetings might be staged concurrently in the remaining area. It is a floor of some two-and-a-half acres extent, with a ceiling 130 feet above. It contains the world's largest stage.

The Atlantic City Auditorium, according to Mr. Dickey, is the largest building of its kind in the world.

The structural steel used weighs 12,000,000 tons. The building required 42,000 cubic yards of concrete, 65,000 barrels of cement, 23,000 tons of sand, 53,000 tons of mixing stone, 2,000,000 square feet of concrete forms. Some 10,000,000 bricks were set, and more than 200,000 tons of sand were removed in laying the foundation, the piles of which—36,000 cubic feet in all—extend 50 feet below low-tide level. Mr. Dickey stated that approximately 150,000 persons could comfortably be accommodated in the entire building.

The Auditorium organ is operated from two giant consoles, each with six manuels affording a total of some 1,000 stops, and is lifted and lowered from the orchestra pit by special mechanisms. Its 32,000 pipes, some of which are 64 feet long, give it a wind pressure twice that available in the Liverpool Cathedral, where hitherto the most powerful organ in the world has been housed. A powerful amplifying mechanism makes it possible to hear a whisper from end to end of the main floor roughly 500 feet long.

Why Does Coal Coke?

An Authoritative Discussion of Our Present Knowledge of the Constitution of Coal and the Relation of this to its Coking Properties.

By Wilbert J. Huff

Professor Gas Engineering, John Hopkins University

IN any attempt to determine the constitution of coal which goes beyond the limits of a simple approximate and ultimate analysis, major attention must be given to the action of solvents upon the coal, since the task of analyzing the complex organic mass which is known as coal into definite understandable compounds would be greatly simplified were it possible to separate the various components by some simple solvent action.

The attempt to resolve coal by means of solvents is recorded as early as 1849 by Schrotter. The first systematic study was by D. M. Marsilly in 1862, who studied the action of alcohol, ether, carbon disulfide, benzene and chloroform on various types of coal. One of the most important solvents in this study is pyridine, which has remarkably high extractive properties. Extraction with boiling pyridine upon pulverized coal after several hours action gives a dark brown solution showing a green florescence. The amount obtained varies with the rank of the coal, being practically zero with anthracite and from 35 to 40% with good gas coals. The extracted coal possesses little or no coking properties.

Separation by Solvents

Wheeler and his associates introduced the separation of the coal constituents into three groups by extracting the pyridine soluble material with chloroform. The residue of insoluble material from the pyridine extract was denoted the *alpha* constituent and is a brown, infusible powder which gives gas and very little tar, this tar consisting chiefly of phenols. The residue from the chloroform extraction was named the *beta* constituent and this also is a brown powder very similar to the alpha constituent save that it is soluble in pyridine. Wheeler and his associates held that these two constituents were derived essentially from the cellulosic material in the original debris but this is opposed by Fischer and his associates who believe that most of the cellulose disappears under the attack of bacteria and the greater part of the material remaining is due to the lignin.

The chloroform soluble material is denoted the *gamma* constituent and this is the resin or lac. It melts with some coals at about 100° C. and upon distillation yields gas and tars, compounds of olefines, paraffines and naphthenes but no phenols. This constituent is derived from the resin in the coal. Pyridine is very difficult to remove completely in all its traces from both extract and residue and this constitutes an important objection against its use. Whether pyridine is a true solvent or not is open to some considerable question. It is said to "resolve" a coal and this action may in part at least be that of a reagent.

Illingworth holds that "the action of the various coal solvents is a question of the depolmerization of the coal substances" and has found that the solubility of a coal in pyridine decreased with an increase in its carbon-hydrogen ratio.

The Illingworth Theory

One of the most important contributions of Illingworth has been his coking theory in which he correlates the plasticity of a fusing coal with the amount of gamma or resinic constituents and their melting point and viscosity. The physical property of the coke obtained is to a large measure determined by the temperature to which the coal is subjected and the proximity of that temperature to the melting and decomposition temperature of the gamma constituents, thus at about 400° C. is the coke formation temperature of coals producing porous coke. The coals producing the dense coke form coke at 430 to 450°C. The gamma constituents are alone capable of giving coherence during coking, beginning to melt at 200°C. and may be fluid at 350° C.

In developing this coking theory Illingworth has introduced the idea of "one stage and two stage," etc., coking, and these stages are determined by the narrowness of the range of critical temperatures at which decomposition of the various fractions occur such as the destruction of the beta fraction, the destruction of a gamma fraction and cementation of the gamma residue. With one stage coals the destruction of the beta and gamma fraction takes place wholly over a narrow range of temperatures. Two and three stage coals are found where there is a marked interval between the successive reactions due to the different supplies of the beta and gamma fractions. In following through the work of Illingworth it appears that it may be possible by a process of fractional decomposition to greatly modify the characteristics of a bituminous coal to give a type of semibituminous or anthracite coal as may be desired.

Use of Benzol Under Pressure

One of the most important researches which correlates the coking of coal with this extraction by solvents is that of Fischer and his associates. As a solvent Fischer used benzol at 275° C. and at pressures up to 55 atmospheres. The insoluble brown powder left after extraction with benzol is similar to the alpha and beta constituents of the pyridine extraction. The extract can be divided into two components by means of petroleum ether, one of which is soluble in gasoline and the other is a solid brown insoluble body. These soluble and insoluble materials separated by petroleum ether from the benzol extracts are called by Fischer, bitumens, the two being differentiated by the terms "oily bitumens" and "solid bitumens" and the sum of the two is the total bitumen.

These bitumens were found to be responsible for the

caking and swelling properties of the coal, the oil giving its caking properties while the solid gives its swelling properties. The older the coal the larger is the percentage of oily bitumen in the total bitumen but the quantity of the total bitumen is found to become less with the older coals. The decomposition point of the solid bitumen rises with the age of the coal and is of more significance in causing swelling than is the total quantity of solid bitumen. Fischer found that if the decomposition point lies at a temperature at which coal is plastic then the swelling is greatest. Quantity on the other hand is of the greatest significance in the case of the oily bitumens.

Bitumens and Coking

Fischer showed these bitumens to have the property ascribed to them by demonstrating that the excessive extraction of a strong swelling coal causes the swelling properties first to disappear while the coal remains coking; further the extraction causes the coal to lose its coking property. If the total extract is added to the extracted coal residue the original coking property of the coal returns. If the oily bitumen is added alone, the coal resulting is a non-smelling coking coal while if the solid bitumen only is added, poorly coking but strongly swelling coal is the result.

In good coking coal the bitumen melts at 300 to 350° C. and gradually gives off gasses in decomposition. The temperature of the residual portion continually rises to the melting point of the coal and eventually hardens to a dense coke. In the case of gas coals of high volatile matter, the coke is weak and porous due to the distillation of the volâtile matter, while in the non-coking coals the bitumens are decomposed. Lean coal, that is coal low in bitumens, has its bitumens decomposed before being heated to the melting temperature.

These and similar researches which correlate the coking and gas making properties of coals with their extraction by solvents offers a guide to the selection of coals for blending to secure coke of the requisite strength and density for metallurgical purposes.

Test of Coking Power

The work of Fischer and his collaborators on the benzol extraction is reviewed by Damm who reports that the conclusions of Fischer are borne out by practice but finds that the method is too cumbersome for general adoption in coke plants and recommends, therefore, certain other tests, chiefly mechanical, for determining the caking and swelling properties. Damm recommends the method of Meurice in which one gram of finely divided coal is coked with finely divided sand. The amount of sand in grams that the coal can bind together is a measure of the caking properties. This author, however, distinguishes between the rising and swelling properties of coal, the rising properties being determined against no pressure, while the swelling properties are determined against pressure.

The best coking chamber is fitted with a movable piston for the rising property, the magnitude of the motion imparted upon the piston arranged to have no weight being a measure of the rising. The swelling properties are determined by the amount of weight necessary to load down the piston to prevent motion.

Damm points out that, contrary to popular belief, swelling is a desirable property in coke. The greater the caking quality the more readily the coal melts and the higher the swelling property the denser the coke. Swelling is only undesirable when it is so great that the oven wall cannot withstand the pressure. Sticking ovens are due chiefly to a failure of the coal charge to shrink in the last hour of coking.

The caking property is destroyed by distillation of the coal under conditions favoring the production of gas preliminary to melting. The swelling property is reduced by the decomposition attending the gasification which occurs during the fusion period.

The theory which ascribes the cementation of coke to the decomposition of unsaturated hydrocarbons, particularly those containing triple bonds has been advanced by Sinkinson. He shows that these, when thermally decomposed, yield compact, finely divided carbon of excellent cementing properties. Since the amount of these is, however, very small, it is probably that the theory which ascribes the cementation of the coking coal to the resinic constituents is largely correct, altho the decomposition of the gases may contribute in some small part.

Phenol Extraction

Extraction of the coal by phenol gives results somewhat comparable with those obtained in the use of pyridine. This extraction was first introduced by Guignet in 1879 and was used by Frazier and Hoffman in work done at the Pittsburgh Station of the U. S. Bureau of Mines. This work was not pursued sufficiently far to determine the nature of the various materials which were separated from the phenol extraction by fraction extraction with other solvents.

Parr and Hadley have also investigated the use of phenol as a solvent for coal and find that the extracts are slightly richer in hydrogen and carbon than is the original coal. Both the extracts and the residue, as is the case with pyridine, absorb oxygen very readily. Parr and Olin found that the phenol soluble material has a definite melting point and that this material in its final decomposition furnishes the binder for the production of the coke. This extracted material consists largely of highly unsaturated compounds and if this comes in contact with certain decomposition products from the heating of coal these unsaturated compounds unite with the oxygenated material to form compounds having totally different characteristics, chief among which is absence of any melting point and, consequently, the absence of the coking property.

Pre-treatment of Coal

Parr and Layng point out that a coal which is finely divided and which has been exposed to air for some time will have lost its coking properties even though the coal was originally a coal of coking type. They therefore reason that such a coal may be handled in the coking process in such a manner as to eliminate the oxygen compounds in order to avoid the disastrous reactions with the active coking constituents, and they show that this can indeed be done by suitably preheating the coal.

The same procedure makes it possible to coke high oxygen Illinois coal. Substantially the desired effect of eliminating the oxygenated compounds is obtained by preheating for some time coal at a temperature below its fusion point. This preheating has the added advantage that it bears off moisture and consequently decreased the amount of heat necessary to coke the coal in the subsequent processes, thereby making it possible to greatly increase the coking capacity of a given installation.

Net Results of Extraction Methods

Much of the foregoing can best be summarized in the words of Stopes and Wheeler, who say: "Evidence has been obtained of the presence in bituminous coals of small quantities of (presumably but little altered) resins extractable by ether. Free hydrocarbons exist in small quantities in coal. Whatever be the exact nature of its action, pyridine affords a means of resolving many coals in such a manner as to render subsequent chemical action less difficult."

Chemical Attack on Coal

In addition to information concerning the constitution of coal revealed by the action of solvents, important contributions have been forthcoming as a result of the study of the attack of various chemical reagents on coal. One of the most important of these lines of attack involves the action of concentrated alkali. Peat, brown coal, and lignite when digested in concentrated alkali give a deep brown solution which, when acidified gives a brown precipitate to which has been given the names of ulmic acid, ulmin, humic acid, humin substance. The English investigators have preferred the terms ulmic acid and ulmin but the French, German and American investigators have preferred the terms humin and humic acid.

The materials are colloids of unknown constitution. They are found when wood undergoes "wet rot" and can in general be isolated from the natural products of decay of vegetable matter. They probably consist of a host of brown or black materials. When precipitated and dried they give a hard substance with a vitreous fracture. The amount obtained by the action of the alkali is the measure of the geological rank of the coal. Peat to the amount of 50% or more dissolves in alkalies. A very much smaller proportion of lignite and of brown coal can be dissolved but the deep brown solution is nevertheless obtained. Practically nothing is obtained from the true bituminous coal or an anthracite. Weathering or slow atmospheric oxidation, as well as treatment with oxidizing agents such as nitric acid, will liberate the humic matter in high rank coals.

It is to be regretted that the chemistry of these humic or ulmic substances is so complex and obscure, for it is generally believed that knowledge of the chemistry and constitution of these materials would throw important light upon the chemistry and constitution of coal.

A number of researches using various oxidizing agents are summarized by Stopes and Wheeler to which the reader is referred for further information upon the action of such reagents as chromic acid, ozone, iodine, bromine, etc.

The action of oxygen at high temperature under pressure has been studied by Fischer and his collaborators. Fischer points out that celluloses when treated with oxygen and water at normal temperature and pressures, yield oxy-celluloses. When treated with a solution of sodium carbonate at 200°C. and from 40 to 53 atmospheres of oxygen, the yield is oxalic, fumaric, and succinic acids and traces of acids having furan ring. Lignin treated with a solution of alkali and air from 43 to 50 atmospheres at 200°C. yields chiefly aromatic acids as mellitic, pyro-mellitic, isophthalic and benzoic acids. Resins and waxes when heated to 200°C. with alkalies are partly saponified. Brown coals when treated with air or oxygen for 7 hours at 200°C. in the presence of alkalies yield principally aromatic acids as is found in the case of lignin. Oxidation under pressure of bituminous coal shows 40% of non-volatile acids, ¼th of which were aromatic acids, benzoic and phthalic being 12% of the weight of the coal taken. From this data Fischer therefore holds that the humic products come from the lignin of the plants rather than the cellulose but Stopes and Wheeler, after summarizing all the evidence, hold that cellulose and lignin together with plant protein materials contribute to the formation of the coal substance.

Of recent interest is the action of reducing agents, particularly hydrogen under pressure, on coal. As early as 1869 Berthelot noted that wood when treated with aqueous hydroiodic acid at 280°C. under pressure yields saturated hydrocarbons.

Fischer and Tropsch verified these results and show that sodium formate and water in an autoclave at 400°C. is capable of hydrogenating coal, the amount of ether soluble oil for the different ranks of coal being as follows: anthracite, 1.6%; bituminous, 9.2 to 39.2%; brown coal, 26.8 to 45%. Good results were also obtained by heating the coals to 400°C. with carbon monoxide and water under pressure.

The considerable interest in this general subject is largely due to the effort of Bergius to produce commercial oils by the hydrogenation of coal under high pressure. He uses an oil to disperse the finely divided coal and the hydrogenation is effected by the means of gaseous hydrogen. The mixture of coal, oil and hydrogen is maintained in suitably designed steel containers and the reaction is carried out at a temperature of 400°C. at a hydrogen pressure of from 100 to 150 atmospheres. An oil said to be as much as 80% of the coal is obtained. This process is being investigated at a number of places in Europe. Some of the reports of the other investigators do not agree entirely with the findings of Bergius.

Defining "Good Gas Coal" and "Good Coking Coal"

In closing this paper it may be well to point out the chemical limits which are usually said to define a good gas coal and a good coking coal. In general it may be said that the best gas coals are those in which the percentage ratio of the hydrogen to the oxygen is above 50 on a dry coal basis. The gas coals will usually yield from 30 to 38% volatile reckoned on the dry ashless coal when tested at 900° and give a finely porous coke.

White has examined the relation between the hydrogen-oxygen ratios and the coking quality of the coals. He finds that those coals having a hydrogen-oxygen ratio on the percentage basis of 59 or more and having a fixed carbon content of less than 79 (reckoned on a dry, ashless coal basis), with a few exceptions, make coke by the ordinary commercial processes. Nearly all of those below 59 and above 55 make coke and many ranging down to the ratio of 50 give a coke. In general, however, cokes made with coals having a hydrogen-oxygen ratio less than 55, are usually very poor and apt to be brittle and dark.

There is the well known hypothesis that there exists a dependence of the coking principle upon the relative amount of available (net) hydrogen. This method endeavors to ascertain from the ultimate analysis whether or not the coal will coke, and is said to apply successfully in certain areas and groups of coals while in other groups it fails. While most of the coals having available hydrogen of 3.8% or more will coke unless they

are too high in fixed carbon, some good cokes result from coals with less than 3.5% and in some cases cokes are obtained from coals having as low at 3.20 available hydrogen. Other coals with much higher available hydrogen, however, failed to coke in a commercial test and the method breaks down conspicuously in the highest semibituminous coals.

In general it may be said that the hydrogen-oxygen ratios on the dry coal basis for coals of less than 79% fixed carbon (in the true coal) furnishes the best criteria for determining the presence of the coking quality from the ultimate analysis. Coals of a high hydrogen-oxygen ratio which refuse to coke are clearly distinguished by their marked calorific deficiency.

Bookkeeping Division, The Peoples Gas Light and Coke Company, showing simplified system of bookkeeping.

Keeping 800,000 Accounts Without Books

By John J. McGrath

The Peoples Gas, Light and Coke Company, Chicago

RECENTLY The Peoples Gas, Light and Coke Company installed the simplified system of bookkeeping which meant discarding big ledgers and replacing the huge volumes and their by-products of smaller books and ledgers with a new system of gas bill coupons in trays. Switching from the old to the new order of things meant a complete change all around and out of the transition came something that was startling to say the least. The new procedure completely altered the Chicago company's bookkeeping division even to the extent of installing new furniture and office paraphernalia in keeping with the new era of "bookless bookkeeping."

The transformation was so very quiet that few in the company's own organization knew what it was all about until visitors from other public utility companies dropped in to "see your new system." Then functioned a modern application of Emerson's phrase about the mousetrap, and public utility men and women from all over the United States and Canada "beat a path" to the Chicago company's offices where they keep track of more than 800,000 customers' accounts.

Hardly a week passed but what some delegation was in to see what was going on, and even while this is being written a party of out-of-town visitors are being shown through the department, down past the long even rows

of polished desks, with men and women comfortably seated carrying on work as it appears to be done in any office other than a bookkeeping department. Only a few weeks ago they had visitors from Japan and the gas men from the Orient were impressed with the splendid new offices and the manner of turning out the big job of checking and auditing nearly a million gas bills every month.

The old time conception of a bookkeeper as that of an angular looking fellow perched up on a round stool with the inevitable green eye shade cocked over his eyes is passe. New furniture and new equipment came in with the new simplified system of keeping books and the bookkeepers in the Peoples Company have new desks of the height of regular desks, which contain sections in which the stubs of the gas bills may be placed. There are no "books to keep." When the customer is billed a machine operation fills out the body of the gas bill, the stub or coupon and still another stub or coupon —all on the same bill. A carbon copy of the last stub or coupon is retained in the bookkeeping division, the original stub going into the bookkeeper's tray and the carbon stub being retained as a register of consumption of gas.

Meter Reader's Card as Ledger

The meter reader's card serves the purpose of a ledger with last month's reading and this month's reading of the meter together with the consumption of gas which is noted on the card at the time the inspector reads the meter. The cards are despatched to the Billing Department, which adjoins the Bookkeeping Department and billing the customer is a comparatively easy matter. So as to further expedite things they have what is known as the division of labor plan. Instead of one bookkeeper having full control of all accounts in his district, the work is segregated into a meter review section, meter book file section, ledger control section, ledger record file section, check and final bill section and the inquiry division. This last section, an important one, takes care of all requests from the public. The work is so divided that instead of each person doing 27 operations as formerly, the maximum is nine and the minimum three. The features of the stub plan and the division of labor are of special interest to the customers of the company, in that there is a speeding up of orders, a better control over the work and a reduction in the possibility of errors. A striking example of the way in which this works out was shown during the moving peak periods that occur twice a year when half the city packs up and moves.

Although general moving figures showed the trend to be greater than ever last year, the average number of orders on hand in the Bookkeeping division were approximately 2900 daily as against more than 6200 the previous year and 10600 tne year before that. Figures for both May and October—when the rush is on—showed very low marks for last year as compared to previous years.

Other features commend the new simplified system of bookkeeping such as a saving in floor space and the general attitude of the employes in the department. Every man and woman on the job likes the new idea of "bookless bookkeeping." Not only has the work been made easier but more chances for advancement are opened since the division of labor plan represents numerous responsible jobs. Under the old plan a man might start as a clerk, become assistant supervisor and so on up. Now he can advance through six stages before he arrives at assistant supervisor, all of which makes for a greater incentive all along the line.

THE ENGINEER IN GOVERNMENT

As applied to Government, engineering will mean using fewer officials to do the present amount of work or doing more work with the present force. Many terms in common use by the engineers—such as obsolescence or elimination of waste or even simplification of practice—are unknown to the politician or at best are pronounced by him only with difficulty. The engineer may also give an altogether new meaning to an old political word—machine. Another job for the matter-of-fact engineer in the field of industrial economics is to take some of the psychology out of the business cycle, that resultant of the forces of Nature and of human nature—both of them proper subjects for engineering control.

Engineers know the facts better than the economists, and are less hampered by reverence for economic theory, much of which is the worse for wear and should soon be replaced by something up to date. And even more would the engineer type of mind be an asset in public affairs. With the engineer, fact-facing and fact-using are all in the day's work, but fact-facing is a too uncommon practice with our statesmen, and fact-using is far from being a habit of our politicians. Engineers use facts not as pieces on a chess board to be moved back and forth in a contest of wits, but rather as foundation stones to be assembled where needed and arranged in a fixed and logical order.

George Otis Smith, Director,
U. S. Geological Survey.

BY-PRODUCT COKE PRODUCTION INCREASES WHILE BEEHIVE OUTPUT DROPS

By-product coke production established a new high record of 48,205,577 net tons last year, an increase of 9.8 per cent over 1927, according to a report just issued by the Department of Commerce, through the United States Bureau of Mines, giving preliminary statistics of coke production in 1928. Beehive coke production, on the other hand, dropped to 4,376,000 tons, a decrease of 39.3 per cent from 1927. The coal consumed in the manufacture of coke in 1928 amounted to 69,260,000 net tons charged in by-product ovens and 6,901,000 tons in beehive ovens.

Pennsylvania continued to lead in the production of both by-product and beehive coke. In by-product coke production Ohio ranked second; Indiana third; Alabama fourth, and New York fifth. The potential annual capacity of by-product ovens at the end of 1928 was more than 58,000,000 net tons.

The indicated consumption of coke in 1928 was approximately 51,796,000 net tons as compared with 49,874,000 in 1927.

These and other preliminary coke statistics are contained in the Monthly Coke Report No. 11, which may be obtained upon request of the United States Bureau of Mines, Washington, D. C.

Functions of A Public Utility Statistical Department

By Barclay J. Sickler

Statistician, United Public Service Company, Chicago, Illinois

THE primary purpose of a public utility statistical department is to serve as an aid to management. In this era of large scale enterprise and of long-distance control, it is very difficult for a manager to keep in contact with all that is going on in his business. Formerly, when small industries were the rule, a manager could know personally all the significant facts about his business with comparative ease. As a result, aids to management such as the methods of statistics were not considered necessary. Under modern conditions, however, all aids to centralized and long distance control become very important. Statistical departments thus have a definite place in most large enterprises and in many smaller ones, their task being to discover and interpret the facts about the business, and to present their findings to the management in a clear, concise form.

Statistics may be defined as consisting of the methods of collecting, analyzing and presenting numerical facts. Specifically, then, it is the function of the statistical department to make available those numerical facts which will be of service to management in conducting its business. Although each of the three tasks mentioned has its own problems, all three of them must be done simultaneously. The collection and presentation of data cannot be done intelligently without a great deal of analysis to determine what items are significant.

I—Indexes of Current Operating Results

Probably the most important task of the statistical department is keeping the management informed as to the results of current operation. Facts which these current indexes should include may be divided into two classes —(a) those having to do with operating results, and (b) those concerning financial results. Those facts which concern the production, delivery, and selling of the product are operating items. In this class, data relating to operating costs of various kinds are of greatest importance. Financial facts are those which have to do with the acquisition, use and return of capital. These might be said to be chiefly concerned with a particular kind of cost—the cost of capital. Typical examples of each class are (a) the operating ratio, and (b) the rate of capital turnover. The two types, of course, are intimately related.

In either of these two divisions, ratios afford much useful information. The trends of the business are in many cases best portrayed by the trends of certain ratios, particularly when taken in connection with each other. Ratios are merely the numerical expressions of significant relationships. For example, the operating ratio is an expression of the relation of operating expense to gross revenue. As it is the connection between facts, not their mere existence, which is most important, the comparison of relationships, or ratios, usually yields much more valuable information than the comparison of the simple data.

As has been said, operating statistics most often have to do with costs. Here two important items to be noted are the changing relationships of different kinds of costs to each other, and the connection between costs and operating conditions such as load factors and plant utilization. Changes in unit costs over different periods of time also constitute an important index to the efficiency of operation. These unit costs should cover production, delivery, and merchandising of the product, as well as tne costs of administering the organization. Not only costs per unit of product, but also costs per customer and per unit of demand should be watched. Certain kinds of costs should be compared to the production, while others are more significant when compared to the number of customers or to demands. This is true because the amount of some items of cost are determined by each of these factors. The peculiar economic characteristics of public utilities, requiring as they do connection to each customer and a continual readiness to serve, are responsible for the complexity of these cost relationships.

Significant financial relationships are chiefly those which concern the efficiency and profitableness of the use of capital. Most important of these are ratios o earnings to financial requirements, and of gross and net earnings after various charges have been met to investment and to net worth. In addition to relationships of this nature, changing ratios of capitalization should be watched.

Such simple things as comparative gross and net revenue, and physical quantities produced and sold are likewise very serviceable indicators of the trend of the business, especially in public utilities where few inventories are necessary and the collections problem is reduced to a minimum. These items possess the great advantage of being easily understood.

The facts and relationships selected as being significant should always be presented in comparative form. A figure or ratio by itself means very little. Only when compared to a standard of some sort does it possess its greatest value. Standards may be obtained either from within the organization or from outside. Those derived from within are ordinarily of two types—comparison with previous similar periods of time, and comparison of different plants. The holding company is particu-

larly adapted to this latter type of comparison. Comparison may also be made with some figure which has been selected as "normal." Standards from outside the organization may be obtained from averages over the entire outside industry or over a particular section of it, or from selected individual plants.

In presenting the facts which best indicate business trends, liberal use should be made of graphics. The value of charts and diagrams as aids to quick and thorough understanding of what is happening, is very great. In no other way can relationships between facts be better brought out, or comparison made more clear. The importance of this ease of comprehension is especially great to a management interested in numerous diverse properties. Charts and diagrams are of many different types, of which the most common are curves and bar charts. A thorough knowledge of the use of all varieties of graphs is essential to the business statistician.

In selecting the facts to be collected and presented in graphic form discretion must be exercised. If the greatest usefulness is to be secured and confusion is not to result, too great detail must be avoided. Only those facts and relationships which are vital in controlling the business should be selected; more detailed investigation may be made when the graphs indicate conditions that need to be remedied. Unless selection is exercised an unintelligible and useless jumble will confront the manager.

II—Forecasting

Forecasting work is another task of the statistical department which deserves special attention. The problem is too involved to do anything here except indicate what it is. Obviously, industries like public utilities which require large amounts of fixed investment to carry on their operations are vitally interested in knowing as closely as possible what lies in the future. If growth is to be expected, as it is in most public utilities, considerable time is needed to prepare for it. For these reasons public utilities are all concerned with fore-casting of one sort or another. Probably if more of them utilized the methods of statistics in greater degree, they would do this more effectively. The Bell Telephone system has a very elaborate organization to handle its forecasting work, and because of these efforts has been able to meet the exacting demands made on it much more easily and effectively.

The primary problem in forecasting is, of course, to predict the growth of the organization. Because public utilities are monopolies, in their case this resolves itself into predicting the growth of the community served, although consideration of possible new uses and more intensive development of the territory also enters. When once the probable growth of the utility has been determined, the results of this forecast may be applied to the prediction of construction needs, which in turn must be used in determining labor, materials and financial requirements. In performing these tasks the forecasting of prices of construction and raw materials, wages, and interest rates is necessary. Probably only in the case of the largest companies will it be found advisable to do this work in the organization. Numerous outside agencies are now engaged in carrying on this type of work, and usually their results may be adapted to the particular needs of an individual company.

The final step in the use of predictions is their application to the preparation of budgets of various kinds. Construction, financial, and operating budgets are the most important types.

Unless constituted of a very complete and diverse personnel, the statistical department could not carry on this work alone, but certainly it can be of material assistance in its performance. Probably the entire organization would be called on to help carry out all these projects mentioned, and the statistical department might very well have charge of coordinating the work, and presenting the results.

III—Statistical Study of Special Problems

These functions of the statistical department in selecting and presenting current operating results and in assisting in forecasting work are very important. As an aid to centralized and to long-distance management the current indexes are well-nigh indispensable. However, almost as fertile fields of work as those mentioned are found in the analysis of special problems which arise from time to time. The importance of quantities produced, costs, revenue, and other numerical facts in the study of many kinds of problems is universally granted. The methods of statistics have been developed particularly for the study of numerical facts, and wherever problems involving such data are concerned, may well be used.

First in importance of these special problems is that of making detailed investigations when the record of current results indicates that something is wrong. In such cases more involved analysis of operating conditions and results may be made, until finally the exact cause of the difficulty is ascertained.

Second in importance may be placed problems involving rates. These are peculiarly adapted to statistical analysis, both in preparing cases for presentation to commissions and in scientific rate-making. The relationship of load curves to costs, the extent and effect of diversity of use, average bills and rates, the probable effect of added customers on costs, and other aspects of rate problems all may be effectively studied by the use of statistical methods.

Special problems in connection with personnel administration also are suited to statistical analysis. Problems illustrative of this type are the study of the relationships among wages, working conditions and efficiency; comparative labor turnover; the effect of welfare work on efficiency of labor and on turnover; the results and best forms of bonus systems; the supply of labor; and amounts and trends of wages and living costs.

The analysis of market conditions is another type of problem adapted to statistical methods. The possibilities of the development of new uses, the degree of saturation of present uses, and comparison of the extent to which markets are developed are examples of such problems.

The comparison of present results and costs with those which might be expected under proposed betterments of plant or changes in policy is also a task in which the statistical department can be profitably utilized.

A more or less incidental use of statistical data is in connection with publicity, either financial or in public and customer relations work. Year books and other matter intended for popular consumption are of this character.

TECHNICAL AND GENERAL MISCELLANY

SECURING BETTER EFFICIENCY WITH BUILT-IN PRODUCERS

The producer which is built into a retort bench or a coke oven installation must be operated efficiently, and if all the available heat admitted in the fuel to the producer could usefully be employed only 8.6 per cent of the weight of coke made would be required for carbonization, as against more than 22 per cent. It is suggested that one of the most likely means for reducing the amount of heat lost is the introduction of a better designed step-grate producer with intelligent control to secure a regular supply of good producer gas and the avoidance of solid fuel losses. The ideal producer gas has a high carbon monoxide content, is constant in quality and pressure and is free from dust. To obtain a gas of such characteristics, it is necessary that the fuel area exposed be as large as possible, that the time of contact of fuel and air be as long as possible, and that the highest possible temperature be maintained in the producer consistent with the ash of the fuel being discharged as dust and not as clinker.

The producer should be as wide as possible, consistent with the structural requirements. Narrow producers are uneconomical and hard to operate. A long narrow producer inevitably has a shallow fire in the back, and has a longer perimeter for a given area. The fuel does not flow evenly but tends to arch across it, due to the proximity of the side walls. The cooling water is hard to distribute, and the fire clinkers badly.

The fuel bed should give as nearly as possible a constant resistance to the passage of the air. Clinker troubles are definitely the result of high gasification rates resulting in the temperature of the fuel bed becoming above the fluxing point of the fusible ash. This tends to retard the flow of gases and reduce the available area of the bed, and acts as a deflector, converting the passage of air into channels. This channeling assists in the formation of more clinker by the intense local heat in the open spaces.

Experiments have been carried out to ascertain the advantages that can be gained by the various classes of fuel and methods of primary air, steam and water admission, with special attention to first the regularity of volume and composition of the gas formed, second the percentage of combustibles, especially carbon monoxide, third formation of clinker, fourth loss of combustible matter in pan ashes and fifth dust deposited in flues. Six tests were carried out and are described in detail with tabulated results in the original article. The following conclusions were drawn.

The proportion of carbon monoxide in a producer gas for heating retorts is of greater importance than the total calorific value of the gas, owing to the high calorific intensity of carbon monoxide.

The use of screened fuel on producers is justified from the points of higher carbon monoxide content in gas formed, longer periods possible between attention to fire, less solid fuel losses in pan ashes, less dust carried forward into flues and volume of gas formed more constant.

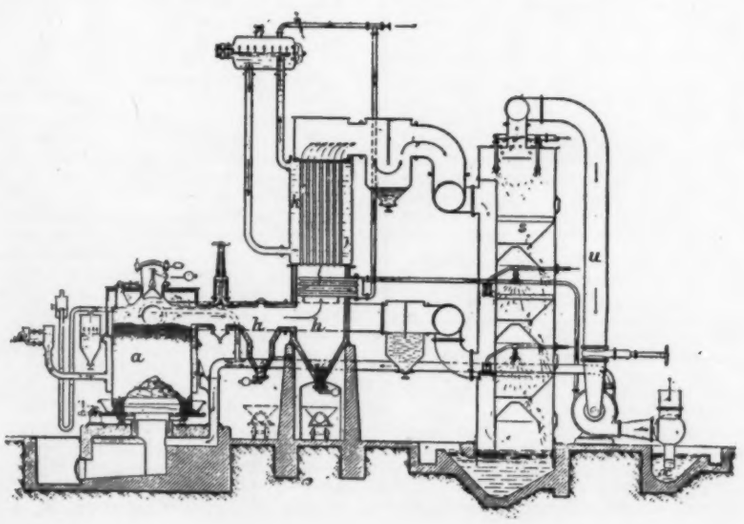
The limit to the employment of steam for cooling the base of the producer is approximately twenty five per cent by weight of the coke used in the producer. Above this figure excessive endothermic reaction takes place, with a reduction in the carbon monoxide content of the gas formed.

Air saturated with water vapor is a powerful absorber of radiant heat. Thus the use of primary air saturated with steam presents advantages over the employment of primary air with the bars cooled by water only.

The solid fuel loss in the pan ash is reduced by working with the front of the producer dry; and it should be possible to work the producer so that the combustible matter in the pan ash does not exceed twenty per cent by weight.—*F. C. Sylvester, Gas Journal, 1928, pages 537 to 539.*

PRODUCER USING COKE BREEZE AND THE LIKE

The accompanying illustration shows an apparatus in which coke breeze and waste can be advantageously employed for the production of producer gas. The installation contains four producers with rotating grates, shown at a. These producers are arranged at equal distances from a centrally located boiler k through which the gas main is led. The dust carried by the gas is deposited and collected in the funnel-shaped containers h. Valves are arranged on the lines so that any of the producers can be shut off from communication with the boiler. The installation is also provided with washers which may be connected with the retorts in case the boiler is out of service. This installation can handle ninety tons of coke (granulated) in a twenty four hour period. The gas production is 357,000 cubic feet, calorific value 1200 calories per cubic meter.—*Journale des Usines a Gaz, 1928.*



REMOVING SULPHURETTED HYDROGEN FROM GAS BY OIL WASHING

The installation, which has been giving great satisfaction for four years, consists of three washing towers connected in series with distilling apparatus, oil coolers and other auxiliary apparatus. A light paraffin oil of Pennsylvania origin was used to wash the gas. About 1.6 liters of the oil were used per cubic meter of gas, which oil was circulated through the washers by means of a pump. When the sulphur content of the coal did not amount to more than 1.5 per cent correct operation of the carbonizing apparatus will keep the sulphur content of the gas under 80 grams per hundred cubic meters. The washed out sulphur is recovered practically in its entirety in the benzol distillate, which is sold for motor fuel purposes without preliminary purification. Approximately 3.2 liters of benzol with about one per cent sulphur content are obtained from one hundred cubic meters of the gas, and the reduction in the thermal value of the benzol is 6.5 per cent.

Inasmuch as the sulphur concentration in the oil amounts to 0.065 per cent at a maximum and is also very small in the gas itself, it may be assumed that the concentration equilibrium between the sulphur compounds dissolved in the oil and in the gas obeys the elementary laws of physical chemistry. On the basis of this assumption and on the results obtained from an extensive series of investigations made by Lewis and Whitman, a theory is developed which is used to calculate the size of the washing installation, etc. A series of factors affect the washing out of the sulphuretted hydrogen from the gas and amongst these the most important are temperature,

rapidity of flow of gas, and depth of the oil in the washers.—*The Engineering Journal, 1928, pages 266f.*

CONTROL OF CALORIFIC VALUE OF GAS

It is stated that there is still great need for more constant control of the thermal value of gas. Various methods which have been adopted for this purpose are accordingly described and brief accounts of the operation and construction of various instruments are given.

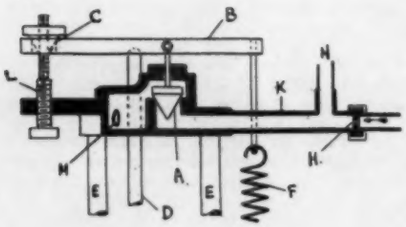


Fig. 1.—Relay Valve.

An interesting method involves the use of a relay valve which is shown in the accompanying illustration, Fig. 1. The valve A is operated by a lever B which is itself moved about its fulcrum point C by the expansion of the hot tube acting through two push rods D. The valve box is positioned by three rods which fix it to the comparison tube surrounding the hot expansion tube. The motion between the valve and the seating is therefore proportional to the motion of the pen on the chart, which is a magnification of the relative motion between the two tubes. By thus fixing the valve and valve box to the tubes, here are no strains on the pen mechanism. The lever B is held against the push rods by the spring F. The relay valve is supplied with gas through an orifice H at a supply pressure of approximately three inches of water. The pressure in the tube K between the orifice and the valve varies with the leak past the valve. There is generally a

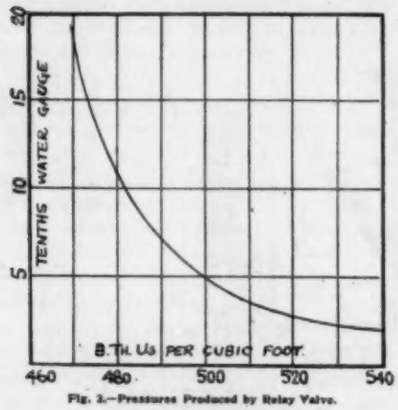


Fig. 2.—Pressures Produced by Relay Valve.

small leak, so that the pressure seldom equals the supply pressure. When the valve opens by a rise of calorific value of the gas, the pressure falls, thus giving the relation between calorific value and gas pressure shown in figure 2. Adjustment of the calorific value at which the relay valve comes into action is made by the screw L, which moves the fulcrum of the lever. The gas which passes the relay valve escapes through the opening M to a waste burner.

The gas pressure variable with the calorific value is thus obtained and this gas pressure is used to open a water valve, shown in figure 3, the connection being made by the tube N. The water valve may be suspended from a diaphragm. The gas acts on the under side of the diaphragm L, and the valve is placed in a water tank, the water acting as a gas seal. When the gas pressure at the relay valve rises to approximately one inch water pressure, the valve is lifted and allows water to flow from the tank to the governor of the exhauster, which has a small container on top of it to hold the water. Water flows out of the container more slowly than it flows in, so that the water level rises when water is supplied to it, and falls when the supply is stopped. It is necessary to have, in addition an overflow tube, to limit the maximum water load on the governor.

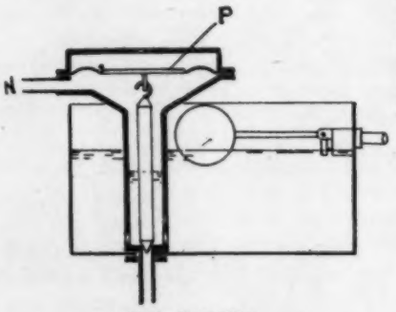
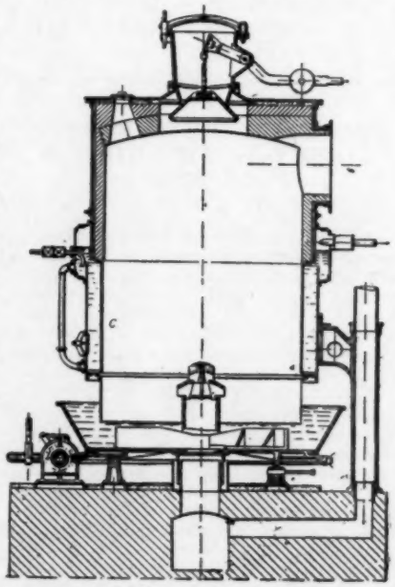


Fig. 3.—Water Valve.

Other systems are also described in the original article prepared by J. G. Stewart, D. Sc. and published in Gas Journal (London), 1928, pages 259-265.

ROTATING GRATE PRODUCER

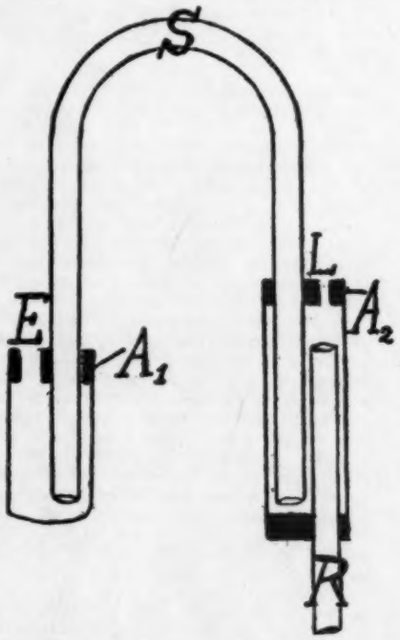
The apparatus is shown in the accompanying illustration to possess a water jacket for the utilization of the waste heat from the producer as well as a rotating grate and water seal. The interior of the producer is divided with a lining of refractory material and the lower portion with a water jacket. The steam produced in the water jacket is used in the gasification process. Only forty per cent of the total amount of steam thus produced is used for this purpose. A special charging device is located at the top of the producer and this avoids the formation of dust and ensures contact between the combustible and the ascending current of gas. The hydrogen in the gas obtained from this producer originates partly from the fuel and partly from the steam. Temperature of the producer is maintained low enough by the introduction of sufficient volume of steam so that the ash is never fused. The addition of the correct amount of steam improves the gas making operation and increases the calorific power of the producer gas. Too much steam, however, excessively reduces the temperature of the producer. Only a portion of the steam is decomposed and carbon dioxide is formed which is non-combustible, while the remaining steam remains in the gas as water vapor. When the gas contains dust and tar, it must be scrubbed and this



entails reduction of the temperature of the gas to about 30 degrees C, the excess heat being again used for the production of steam.—*Genie Civil, Oct.6, 1928.*

A PRACTICAL SIPHON

The ordinary siphon cannot at times be used with good results in removing the liquid contents of demijohns, acid bottles, and the like. A practical suc-

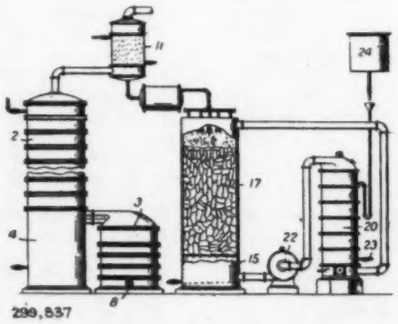


tion siphon is a laboratory necessity, and one such device is shown in the accompanying illustration. The U-tube S is

provided with legs of equal length and these legs are introduced through stoppers A_1 and A_2 into two glass tubes of wider bore than the U tube. One of these glass tubes is closed at the bottom while the other has an open end into which a stopper is inserted and through which the outlet tube R is placed. The stoppers A_1 and A_2 are provided with additional holes. Thus A_1 has the hole E for sucking in the liquid and A_2 the hole L through which air enters, as soon as the level of the liquid has sunk below E. This avoids breaking the siphon. Hence, the siphon is always ready for use.—*H. Wentzel, Chemiker Zeitung, 1928, 898.*

DISTILLING TAR ACIDS

Gas liquor is raised to a point just below the boiling point and air is blown through it to remove phenol, cresol, etc. Gas liquor obtained from a fixed

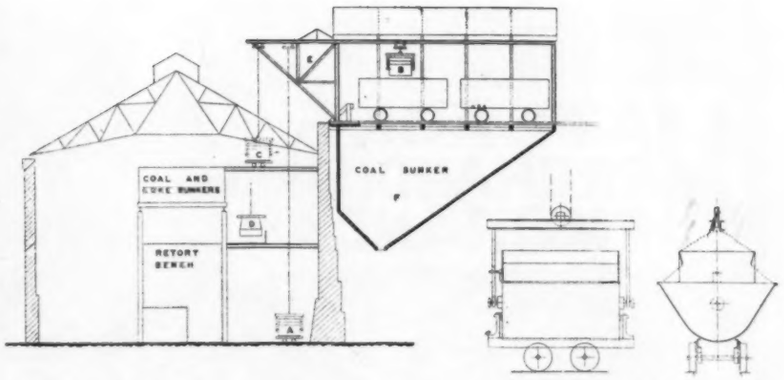


ammonia still 3 and free ammonia still 4 combined with a dephlegmator 11, is sprayed over coke in a tower 17 against a current of air. The tar acids are carried off to a Feld washer 20 fed with caustic soda from a reservoir 24, and heated by steam admitted to it. The steam enters at 23. The air is recirculated by means of a blower 22 back to the tower 17.—*J. A. Shaw, assignor, Koppers Co. British Patent No. 299 837.*

HANDLING COAL AND COKE

The illustration shows a method of handling coal and coke which proved satisfactory in a medium sized gas works. Tipping wagons, each holding approximately one ton of coal are filled from coke storage hoppers and are pushed along by hand on a railway for about seventy yards. The bridge conveyor is arranged at right angles to the railway. The track of the conveyor is arranged in such a manner that anything lifted from it may be deposited either into railway cars or to a platform.

The conveyor is operated by a man situated in a fixed control cabin E above the level of the trucks, from which he can see the side tipping wagon in position A at the ground floor level, and, at the higher level, the trucks ready to be filled. By means of a suitable lifting bale, which is hooked on to the trunnions fixed on to the ends of the coke wagon bodies, the latter are lifted from their carriages a

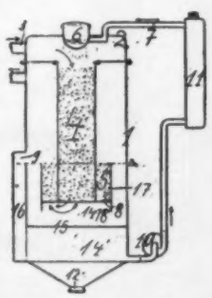


height of 63 feet through an opening in the retort house roof, and then travelled horizontally above the trucks to position B. A catch is then released. The body rotates and deposits the coke in the truck.

It is possible by this means to load ninety tons of coke per normal working day (eight and one half hours).—*W. L. Robertshaw, Gas Journal, 1929, pages 458-462.*

WASHING AND COOLING APPARATUS FOR PRODUCER

The purification tower 4 is located within the casing 1 of the apparatus. Both the height and the width of this tower are less than that of the casing, and the lower portion of this tower is surrounded by a device 5 for removing the water from the gas. The casing 1 is closed at the top by means of a cover 2, and forms a chamber, into which the gases, which are to be purified, pass through the inlet 3. The container 6 is located at the top of the apparatus and is provided with perforated bottoms, which apparatus is fed with water or the like through the tube 7. The latter is connected with the cooling device or a heat exchanger 11 outside of the casing 1, and the heat exchanger is built in the form of a radiator and is fed by the pump 10. The pump 10 draws the



water out of the lower part 14' of the apparatus, which is provided with the discharge outlet 12. The part 14' separated by the dividing wall 15 from the portion 14, in which the device 5 for separating the water from the gases is arranged, which wall forms a conduit 16 opening into a flow-off pipe 9. The outlet 9 lies at the level of the upper edge of the separating device 5. The purifying tower 4 is closed at the bottom by a perforated plate 8 and the casing 17, forming the separating device 5 has a rim 18 which extends downwards beyond the perforated bottom 8. —*E. Warnant, German Patent No. 466,694.*

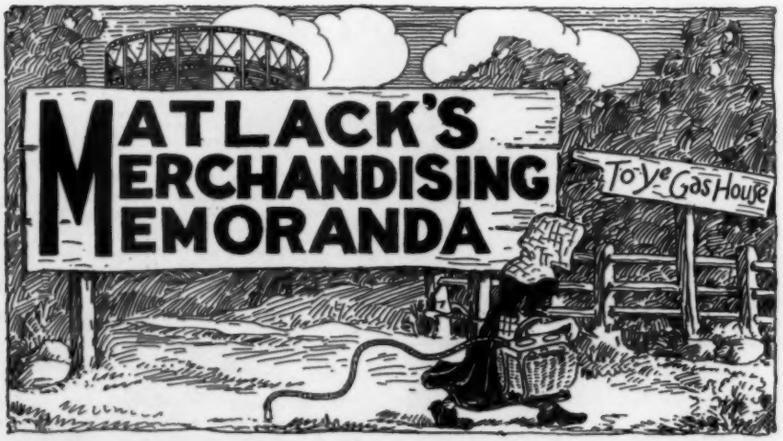
DETERMINATION OF OXYGEN IN GAS

The amount of oxygen contained in gas is a very important matter from the standpoint of corrosion of the pipe lines, etc., with which the gas comes in contact.

The measuring pipette has a capacity of 250 cubic centimeters and the bulb portion of the pipette is surrounded by a glass jacket through which the cooling water is circulated. The stem of the pipette is ten millimeters in diameter and is graduated. The percentage of oxygen in the gas can be directly read from the scale. The graduations read in 0.05 per cent. The upper part of the pipette is furnished with a funnel controlled by a cock.

Two methods are employed, one using pyrogallol solution and the other chromium acetate. The exact details of the two methods are given in the original article. Both methods depend upon the introduction of a definite volume of gas into the pipette which is filled with the special reagent which is prepared elsewhere. The reagent is allowed to absorb the oxygen contained in the gas and then the contraction in volume is read off the scale in percentage oxygen. It was found that both methods are accurate within 0.01 to 0.02 per cent.

Inasmuch as a difference of 0.1 degree of temperature at which the gas is originally measured and at which the final reading is made causes a variation in volume amounting to 0.0366 per cent, it is absolutely necessary that the temperature of the cooling water should be maintained constant within one tenth of a degree Centigrade. When these two methods are used, all difficulty resulting from the absorption of other ingredients of the gas by the reagent is avoided. apparatus.—*Journal des Usines a Gas, 1929, pages 411-2.*



SAD MOMENTS IN SELLING

It has been said that indifference of salespeople is one of the greatest contributing causes for the loss of store sales. Have you made any recent checks to see that your customers are properly approached? With Manufacturers going in for more and more National advertising, creating a demand for their merchandising, bringing people into the stores, it is vitally important that store salespeople be educated to the value of modern courteous approach.

BRIMSTONE AND TREACLE TO THE RESCUE

"Gentlemen", said the salesmanager of one of the country's largest manufacturers of appliances, "our creative department and our advertising department have gone to a lot of pains during the past twelve months to work out a bang-up campaign for those birds you sell. It is especially designed for those fellows who whine, 'the manufacturer don't give us the support,' and we expect you to go out and sell this campaign and its operation." He was addressing the boys from off the road, assembled at the factory for the usual after Christmas meeting.

At this juncture one of the travelers who felt duty bound to say something, asked, "Well, what about getting orders, if we are supposed to take up our time in selling this advertising and sales plan?"

"Ah, that's just what I wished some one would ask", replied the sales manager; "you see it's this way, we have worked this thing out in such a manner that if you are salesman enough to get them to take the dose, we know that they will like it, and we know if they like it orders will be forthcoming.

"The whole plan is so worked out that we are going out to sell folks an idea, with the dealers aid, and in turn they are going to come to the dealer and demand our merchandise for they cannot make the idea work without it. Now, we here at the factory did not think we would have an easy job in selling you men, and we know you are going to experience the same difficulty with some of your dealers, but we depend on you to put it over. This is a tonic like no other that has ever been offered you in getting started on spring sales. It's like the old sassafras tea mother use to insist on, the first dose hard to take, but once taken, the taste created a desire for more until first thing we knew we were into mid-summer and had failed to have a touch of spring fever. And boys I tell you this plan will do the same thing to your dealers; so hie forth and get 'er going early in March."

A SALES SCORE BOARD

Visible evidence that a special sale is in progress often speeds up sales. Illustrated herewith is a sales board that has been used successfully. This board was painted on a piece of composition board about five by four feet; the thermometer registered the progress in per cent of quota set, each day, while the "Daily Sales Record" indicated what each sales man was doing day by day and week by week. The number of heaters to be sold was inserted after the wording: "A Drive To Sell."

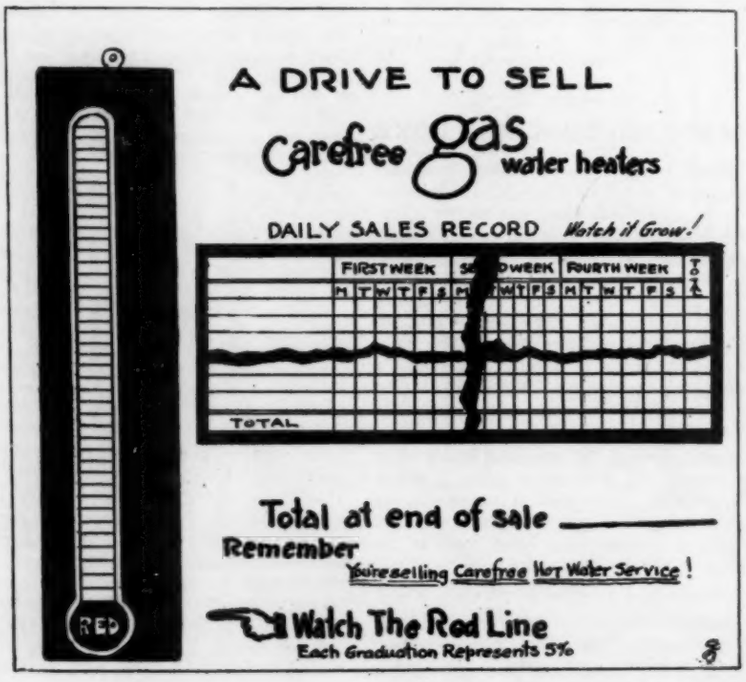
These boards should be posted in the sales room and chalked up each day at the time all the salesmen are assembled.

AND WE DON'T MEAN 'MAY-BUY'

March should find the Home Service Department of every gas company in the country organized to carry on an intensive drive in connection with the Spring Sale of gas ranges. There are many innovations to be offered this year by the manufacturers of ranges and one of the first duties of the Home Service Department is to seek out these new features and get together with the advertising department and devise a plan to exploit them. The gas man who sits calmly by and offers his customers no new and good reason for purchasing a 1929 gas range, with all its color and refinements, is paving the way for the man who sells electric cooking. And we don't mean 'may-buy', for the home manager is ever alert for new ideas in home management.

A SIMPLE BUT EFFECTIVE STUNT

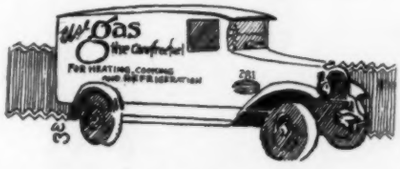
Here's an attention getter. A North Carolina gas man featured toasters in his windows recently by way of a display consisting of several pyramids of toasters and several dishes of toast, with a neat display and price card. It was a fine display by day, and by night is was a better one, for he had secured a spot-light and a revolving color disc screen which



he spotted on the central pyramid. The ever changing colored lights brought people from across the street to see what It was all about and he tells us that his toaster sales mounted.

ADVERTISING A-WHEEL

The old order of building a better mouse trap and sitting calmly by, waiting for folks to beat a path to the factory, is no more productive of the sale of more gas per domestic meter than it



would be to the selling of mouse traps in this day of active merchandising. To make and keep folks gas conscious is an everlasting job, one that calls upon the gas man to keep the advantages of gas service ever before the people.

One company that is alert to the many ways in which this may be done is the Illinois Power and Light Corp. This company employs every device known to advertisers to constantly remind folks that GAS is the carefree fuel. The most recent addition to their many forms of advertising is a new design for truck advertising which may best be described by the sketch shown here. This truck is the first of a fleet to be used by the company and is now in use daily in Belleville, Illinois. In East St. Louis the company has all its trucks equipped with the new day-light reflector type signs. The present one has the wording, "Banish Smoke use Gas the carefree fuel for house heating." This sign is in blue on a black back-ground. These truck signs are changed every three months and the next, we understand, is to feature GAS for carefree water heating, to be followed by one featuring gas for refrigeration.

This company also has been featuring a new version of the "If heat is required" slogan in all their advertisements. the new one saying, "If heat is required you can do it better and faster with Gas the carefree fuel."

SYNTHETIC SELLING

"Synthetic somethings seem to make a go of it," said a certain salesmanager the other day, "but folks, I arise to remark with the kindliest feelings that when a man tries synthetic selling he's on his way down the skid. People just get suspicious of bargains and one of my resolutions for the new year was; Resolved to give the bargain the goodbye. From now on henceforth, I am going after mass buyers by offering them class; first class merchandise, with a fair mark-up.

"In my town I see merchants come and merchants go and after a careful study of the situation I have decided that the one who migrated or made a bust were the ones who had the most bargains to offer folks. On the other hand the fellows who were said to be high-priced and who never had bargains seemed to go on for ever. Hence my resolve not to be known as a bargain house, I am not going to sell cheap stuff in '29 or thereafter, for I find folks will pay for things worth while and that's the kind of things I am going to feature."

That sounds logical and we see no reason why a gas appliance dealer should not sell the best that the market affords and at a price that will give him a fair profit, without the continual 'bargain' sale.

BAIT FOR BIG FISH

Apartment house business is very desirable business and it is surprising that more gas companies do not make a hard drive to secure the same and to educate the apartment house dweller to demand Blue Star appliances for his apartment. The Consolidated Gas Company of New York is one company that has been forward-looking in this regard.

CONSOLIDATED GAS COMPANY OF NEW YORK
From the Kitchens . . .
A Message *to the* Apartment House Owner
Nothing renews an old apartment like a Modern Gas Range. And there is no better way of renewing a vacant one.
CONSOLIDATED GAS COMPANY OF NEW YORK
4 Irving Place

This company advertises to Apartment House Owners and dwellers as well, and they are getting results as is indicated by the reproduction of the advertisement on this page. This company also has been very successful in installing gas refrigeration in apartments. They have accomplished results by reason of their keeping everlastingly at it—they have advertised gas refrigeration throughout the winter and have sold GAS for refrigeration—and, oh brother, how they will cash-in next spring and summer!

PLANNED HOME SERVICE

Planned Home Service work will work wonders in the way of added sales of gas ranges, laundry dryers, incinerators, hot water service, gas refrigera-

tion and other home appliances. Cooking as a whole is the big job so it seems, for the Home Service Worker to put over, and while we agree that it is very important to teach the home manager that the cook book is better than the tin can, the other appliances should be given a break and a talk or demonstration on each of them worked into the program once or twice each year.

Why not work out a plan to sell the home manager happiness in the way of an all gas laundry—sell her 52 carefree wash days. The Home service department may well do this as a spring activity. Show the woman in the home how easy it is to do these things with gas, how efficient they may be done and at what little cost and with so little effort, and we'll be working well to keep up the load per domestic meter.

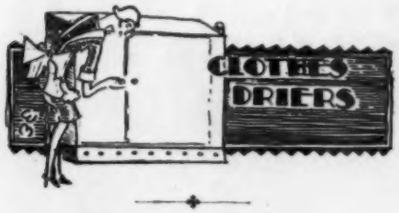
BE AWARE OF THE IDES OF MARCH

The Ides of March make laundry drying a whale of a problem. Restless air currents carrying soot, rain, sleet and snow make this a fine month to aproach the home manager with a "How to Dry Clothes in any sort of weather" appeal. March is an ideal month to sell that other load building appliance the gas laundry dryer, unless you believe the

breeze from an electric fan will do it better. Sell them a sanitary gas dryer this spring.

The little old load builder, and business getter, the gas toaster steps into the picture for March. Why not work-up a toast set, and a gas toaster and a Jade china set. Build up a toaster window and have your Home Service

Department feature a number of ways of making toast and means of making it more appetizing. Garnish it and serve it to all who visit your store thus stopping shoppers where your other wares are exposed.

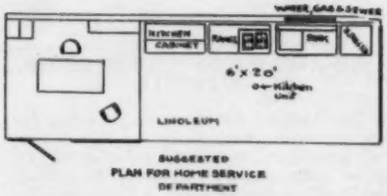


MODEL KITCHEN PLAN

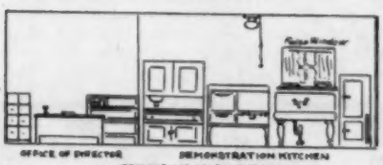
A gas man wrote us the other day that he would like to build a home service department, a model kitchen right in his store but that he did not have a space of over thirty by twenty feet to devote to it, so we sent him the suggestion shown here.

As the sketch will indicate he may have a dandy little kitchen, six by twenty, an office for his director, and there will still remain a space twenty by ten feet in front for visitors. Unless we miss our guess this will be ample for a time and if after a month or so he finds that more room is needed he can in some way rearrange his store so as to secure it. We pass the plan on for what it may be worth to some other gas man.

In checking-up with one of the large metropolitan department stores who conduct demonstrations every day we find that they have a space even smaller than this and that they find it very profitable and plenty large. The idea, of course, is to have a continuous audience, but not a crowd, as in the case of a school.



SUGGESTED PLAN FOR HOME SERVICE DEPARTMENT



WATCH YOUR APPEAL

In writing gas range advertisements for Spring sales the copy writer will do well to bear in mind the fact that the home manager of 1929 is an out-of-doors woman who values and strives to conserve her energy and good looks.

She is looking for carefree cookery—gas ranges that will enable her to be about, yet of attractive, spick and span appearance. The modern home manager challenges tradition and advances the advice, that yesterday's kitchen equipment is for yesterday's pot-watchers—that ranges like raiment must suit the life of the times.

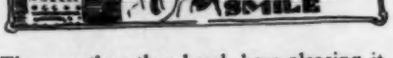
A GOOD COOKING SCHOOL AD

Speaking of planned Home Service, the cooking school always comes in well when planned right, and advertised. The Public Service Company of Northern Illinois is one of the many companies that carry on Home Service in a big way. One of the Home Service Department's advertisements reproduced here indicates how they handle the advertising of a Cooking School. You will note that it is so attractively designed that any woman interested in cooking could not fail to be attracted by it. The original was approximately three columns wide by twelve inches deep.

HOME SERVICE DEPARTMENT
planed home service
Be Sure to Attend the
Cookery School
at the
Domestic Science Room
Toulon High School
Thursday · Friday
November 1 and 2
7:30 P. M.
Interesting talks will be given by our Home Service Department and many new recipes will be prepared and served. You are cordially invited to attend and bring guests.
PUBLIC SERVICE COMPANY
OF NORTHERN ILLINOIS
I. F. Wire, District Manager

PHONE SELLING

There used to be a man in the washing machine business who laid great stress on telephone selling and while he went to a great deal of trouble to work out a telephone sales talk his greatest stress was laid upon the importance of voice control. "The greatest asset a salesman can have", he was often heard to say, "is a voice with a smile", and come to think of it it is a mighty big asset. How often have you been annoyed by the voice at the other end of the wire, rasping, shrill or ear piercing.



Then on the other hand, how pleasing it is to talk to other people over the wire, those who have "a voice with a smile." Folks at the end of the service phone should be chosen for the reason that they have "a voice with a smile."

AN ECONOMICAL WINDOW DISPLAY

Spring range sales call for special window displays in Spring settings. We are offering one here that may be built by any window trimmer, in any locality at a very little expense and without very much labor. A glance at the reproduction will show how simple but effective it is.

A gas range (the one illustrated here happened to be done in Spring Green) centered in the display window with center and wing drops made of white lattice, a basket of lilacs, a couple of display cards furnished by the manufacturer and a central card to tell the story of the plan of purchase, with a floor covering of green velour. This window which was used to tie into advertising that featured A New Model in a New Color won instant approval of passing folks, and, notwithstanding that more costly and elaborate trims were built to sell colored ranges, this one out-sold them all.

It frequently happens that window displays are so well done that they are in reality overdone,—the side show, so to speak, attracts more attention than that going on under the big top. "Cunning monkeys," bouncing balloons, and running water attract attention, but somehow seem to fail to create desire or prompt folks to step up and do their stuff on the dotted line. In other words it seems where there is lots of ballyhoo there's little buying," said a man who has made an intensive study of the effect of window display advertising on sales of gas appliances.

Perfume, Cigarettes and Gas

By W. F. Rightor,
Business Consultant, New York

THIS article is written by one who knows as much about gas as he does about perfume; that is, he knows what it smells like and how much it costs. He was in the perfume business a great many years and was very successful.

The foregoing was written with the intended implication that sales and merchandising methods do not vary greatly in different fields. There are immutable principles of procedure that apply as well to the marketing of gas as they do to the marketing of a product so far removed as perfume—or let us say, cigarettes.

The great tobacco firms manufacture cigarettes under many different brand-names. They own the trade-marks attaching to these different brands and are interested in the successful sale of all of them; in the success of one not any more than of another. Let us assume that one tobacco company owns two brands, one known as Dromedaries and the other as Fortunate Hits. Does this company withhold any advertising or selling strategy on one brand for fear of injuring the sale of the other brand? Not at all, they employ a sales manager and a separate crew of salesmen for each brand and they instruct each that their job is to sell Dromedaries or Fortunate Hits, as the case may be, as hard as they can by every fair competitive method their ingenuity can devise, and without the least regard for any competing brand, whether owned by the same firm or not. Let the best brand win, says the company, very probably with the comforting thought that they win no matter which brand survives, as they own both. No pulling of punches in the cigarette business; when they hit they hit, and it might not be so healthy for other strange cigarette manufacturers to come into that field since even brothers are punching each other so hard. If we have to have competition, they argue, let's make most of it ourselves and between ourselves. If, they say, one brand is so weak, and has within it so little of the elements of success that it can be injured by one of our other brands, then the quicker we kill it off the better for all concerned.

There is somewhat of a breakdown here in the analogy of the merchandising of cigarettes and the merchandising of gas and electric power. All brands of cigarettes are for the one purpose, that of smoking, whereas gas and electricity have each many purposes. The point that it is desired to make, however, is that full and unrestricted competition between one brand of cigarettes and another brand of cigarettes has been found beneficial for the reason that it is well within the realms of believability that one brand truthfully can be the best for one man and another brand truthfully the best for another man. It would seem that no such condition can possibly exist between gas and electric power; it is inconceivable that for the same purpose one housewife could find gas the best and another housewife find electricity the best. In other words, the comparative usefulness of gas and of electricity is not a question of individual taste or fancy but one of demonstrable fact. The proper use of each are things that should not be left to the whims and fancies of the consumer but, on basis of sound economics and demonstrated efficiency, be proven in the research department of the producer.

Competition is a very expensive thing, to both manufacturer and consumer, so where it can be controlled it should be avoided. Most gas companies and power companies are combination companies hence competition, that is, destructive competition, that runs up the cost of the producer and the price to the consumer, can easily and beneficially be avoided by calm investigation and conference between the sales promotional forces of the two competing products.

Let the gas sales manager quit kidding himself into spending time and money in trying to induce the consumer to step back to gas for illumination in the home. Let the electric power sales manager quit kidding himself into spending time and money trying to induce the consumer to step forward to electricity for cooking in the kitchen. Both of them know they are encroaching on the other fellow's field that results can't possibly justify the effort and expense, and worst of all neither one of them practices in his home what they preach from their offices.

The point that it is desired to make is that gas and electric power are competing with each other in several instances for identical uses, each inferentially claiming that it is the most economical, the most convenient or the most sanitary or some such claim. This cannot possibly be true and everybody knows that a sales plan or an advertising campaign founded on anything but absolute truth or at least debatable truth is foreordained to failure; failure in the sense of producing a profit. Here is where investigation, conference and distribution of product—uses should be made. Let each product prove that it is the best in each field or resign that field to the other product and then let the promotional department of each product, unhampered by fool self-competition, go full steam ahead, conscious, as we used to say in the old inspirational days, that every word of sales talk or advertising "leaps white hot from the cauldron of truth."

An executive in considering a question of policy should consider not only whether

the thing suggested is a good thing to do, but also whether the result of doing that thing will be a good thing to have happen. Now, if the withdrawing of a product from the unproductive fields it is now occupying is decided upon as a good move then there will follow a secondary result which is most important.

As a secondary result there will come (and again this writer speaks merely as a merchandising man and salesman in fields far removed from gas and power) a clearer vision and a wider view, to the promotional departments, of the unlimited possibilities for their ingenuity and their imagination. It is in the old army game of "finding new uses for old products."

Consider what has been done with so prosaic a product as a household lubricating oil. A few years ago there came on the market a conveniently packaged lubricant, 3 in One Oil, intended or the home sewing machine. In time, being a good product, conveniently packaged and fairly priced, it captured practically all of the business for which it was originally designed. It's manufacturer, however, pushed much beyond primary purpose and developed 165 other uses for his product in the household. Every one of these new uses was founded on fact, on verity, that is, that truthfully his product would more efficiently and more economically perform the purpose of the suggested use than any other product. As a result of the development of a multiplicity of uses sales mounted to millions of dollars whereas the potential sales possibilities for the original use only were limited to thousands.

Again we are faced with illustration; one an anecdote, the other a fact. Mark Twain said he once felt an irresistible inclination towards wickedness, so he stole some money out of his right hand pocket and sequestered it in his left. Every business man knows he makes money in one department and loses it in another. The trick is to keep our wicked inclinations under "reasonable" control and to eliminate, wherever possible, unprofitable departments.

To sum up, the intent of this article is to suggest that we cease urging both gas and electricity as the "best" for the same purpose, that we recognize the limitations of each product and that henceforth, profit considered, we urge the sale of the one product or the other on basis only of its real economic and efficiency superiority to the other. This being done, much of the unprofitable expense of the respective promotional departments of the gas and of the electricity divisions will be eliminated and the full power of ingenuity, imagination and energy of these departments be concentrated on first finding and then developing fields of new uses. Under these conditions sales volume should increase and sales-cost decrease.

Follow Up Range Customers and Sell Them Other Goods

By Frank H. Williams

"IT'S a funny thing," said a matron in a town of about 40,000 the other day, "but when I went down to the gas company and told them I was interested in a water heater, they didn't seem to realize that I'd bought a range from them before and when I wanted a little time on the heater I had to fill out the same sort of an application blank that I did when I bought the range. I didn't seem to have established any sort of credit with the company at all, even though I made all my payments just exactly as they should have been made when buying the range."

"That's interesting," said the man to whom the lady was talking. "I'm interested in the gas business. I want to ask you if any representative of the gas company has ever called on you since your purchase of your range, to try and induce you to buy some other gas appliances."

"No sir, no one has ever come near me. They've sure let me alone since I bought my range."

And there you are.

Not only did this particular gas company pass up a fine prospect when it failed to solicit this woman to buy various gas appliances but, also, it failed to cash in on the opportunity when it had a chance of impressing her with the thought that her regular payments on the range had established her credit with the company so that she could get any other merchandise she wanted from the company.

How many other companies are neglecting the same sort of opportunities?

Just for the purpose of getting a slant on his question a number of women in five other towns were asked about their experiences with the gas companies in their cities. They were asked if, after their purchases of gas ranges, the companies in their towns had solicited them for other business.

And not one of the women had been solicited.

Also they were asked if, when they tried to make additional purchases of the companies, their former experience had helped them in making purchases easily and quickly.

And about half of the women said "Yes", while the other half said that their former purchasing experiences had apparently made no difference to the companies at all.

Why not make an investigation along this line to see what your own company is doing, Mr. Gas Man? Perhaps such an investigation might show that you, too, are passing up some first rate opportunities.

Certainly there can be no question but the very best prospects for the gas company in the sale of gas appliances are those of its patrons who have bought ranges from the company. These folks are particularly good prospects for the company for these reasons:

First—These folks are satisfied with their range purchases and when a customer is completely satisfied with the first purchase he has made from a company it seems entirely reasonable to feel that he will be equally satisfied with additional purchases.

Second—These people have made their initial purchase from the company and so the ice has been broken and it will be a lot easier for them to make their second purchase than it was to make their first purchase.

Third—Many of these folks are used to paying for their range purchase on the installment plan. Consequently it will seem nothing out of the way to them to make additional purchases on the same method.

Fourth—The folks who have bought ranges need no introduction from a salesman when he makes a call. It is simply sufficient for the salesman to say, he is from the gas company and is anxious to interest the folks in some gas appliance. This is an excellent approach and is all that is needed to start the salesman on his sales talk.

Fifth—The folks are completely sold on the company and so it isn't necessary for the salesman to devote any time and attention to that phase of the proposition. Instead he can devote all his efforts to the sale of the particular gas appliance he is anxious to put across.

A good way of cashing in on the folks who have bought gas ranges is by making up a list of them from past records and then adding to the list the names of all those who buy ranges and then using the list for solicitation purposes.

The ideal time to solicit range purchasers for the purpose of inducing them to buy other articles is right at the time they are finishing their payments on the ranges. At this time many of the folks feel a glow of satisfaction at coming to the end of their payments and they also feel as though they'd like to continue to save money in the same way. So it is a comparatively easy matter to get a goodly proportion of them to take on the installment purchases of other articles.

Another good method of soliciting is

(*Continued on page 59*)

HIGH PRESSURE STORAGE HOLDER

The Most economical form of High Pressure Storage and the *only type which* permits of future enlargement.

The most practical shape for permanent tightness and it can be fabricated and erected at the least cost.

Built on established Boiler principles.

The smallest unit will compare favorably in first cost with any other form of high pressure storage and yet the cost per cubic foot varies inversely with the size.

Attractive in appearance, saving in ground space, low in maintenance.

STACEY BROTHERS GAS CONSTRUCTION CO.

CINCINNATI, OHIO

JAMES E. STACEY, Pres. ANDREW J. STACEY, Vice-Pres. WAYNE STACEY, Gen. Sales Mgr.
ARTHUR A. POPE, Sec. and Treas. WILLIAM A. MILLER, Chief Eng. P. C. RODGERS, Asst. Sales Mgr.
NEW YORK OFFICE—75 West Street—P. F. McEnaney, Mgr. Tel. Bowling Green 8186
New England Representative—Eastern Service Co., Boston.

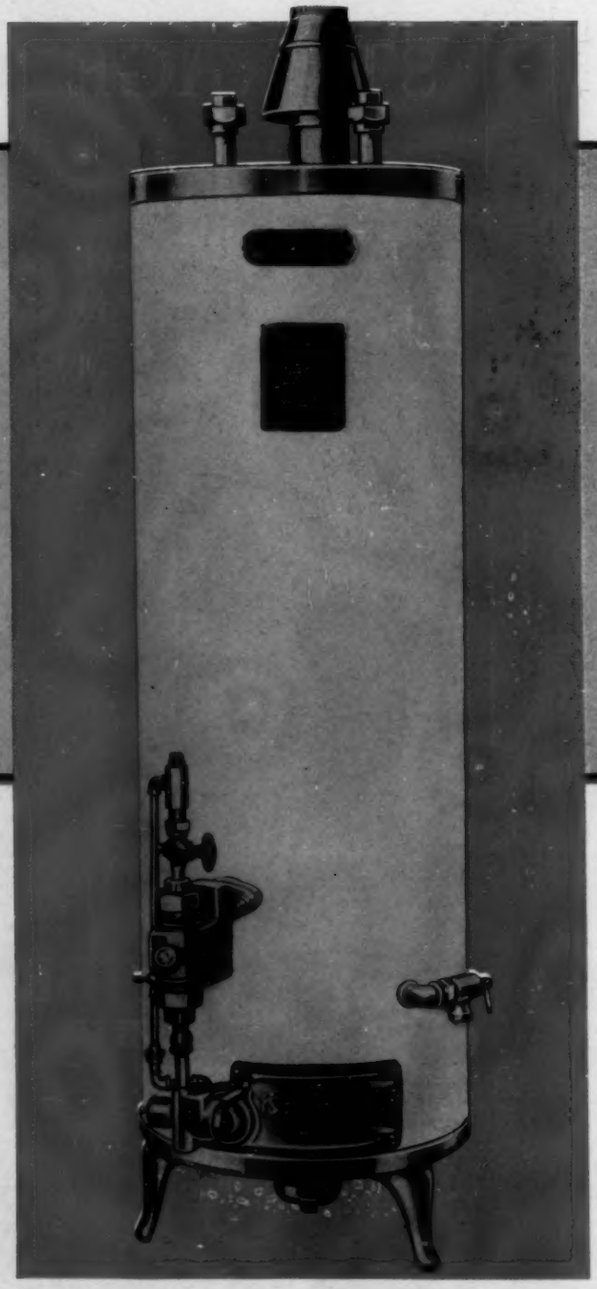
Check these

They PROVE the sales value

Faster Pick-Up

—28 minutes from a cold start

No other storage water heater has a pick-up as rapid as the "Pittsburg-Monarch". The burner has a capacity of 35,000 B.T.U.'s an hour—40% to 100% greater burner capacity than any other system. It operates on an entirely new theory of low temperature and low stand-by cost.



Greatest Value for the Money in the Entire Water Heater Business . .

advantages of the New Storage Water Heater!

Stand-by Cost Cut 40%

The "Pittsburg-Monarch" has a snap action valve that operates on 17 degrees in place of the usual 35 to 40 degrees. This temperature variation reduces maximum heat of water from 150 degrees to 132 degrees, and still supplies 115 degree water at the faucet at low temperature point.

Radiation loss tests show a 50-hour stand-by without operation. No other heater can approach this performance in economy.

Greater Burner Capacity

The "Pittsburg-Monarch" is equipped with the new noiseless "Pittsburg" Burner, built without troublesome gauze to pass 35 feet of natural or 70 feet of artificial gas per hour. Heater operates on 5-light meter.

Extra burner capacity insures absolute safety in using a 25-gallon "Pittsburg-Monarch" on jobs where 30 to 35 gallon capacity heaters are called for.

Beautiful and Practical

Finished in beautiful, lustrous white enamel with nickel trimmings. Tank built of 300-lb. test copper-bearing steel. Insulated with a new, efficient insulating material. Equipped with safety pilot, and combination safety and drain valve. Made in two sizes—25-gallon and 40-gallon capacities. Popularly priced to obtain a wide market.

More Hot Water at Less Cost

The "Pittsburg-Monarch" is a real sensation wherever it has been shown. It delivers more hot water with less gas consumption than any other storage system on the market.

One gallon of hot water for every two feet of manufactured gas. One gallon of hot water for every foot of natural gas. A performance 20% to 30% more efficient than any other storage heater

Pittsburg Monarch WATER HEATER

The strength of a nation, especially of a republican nation, is in the intelligent and well-ordered homes of the people.
—MRS. SIGOURNEY

AUTHORITIES claim that new homes for more than 400,000 families will be built in the United States during 1929.

At least 70% of this new construction will be in gas-served territory. This means a new market for not less than 300,000 gas ranges.

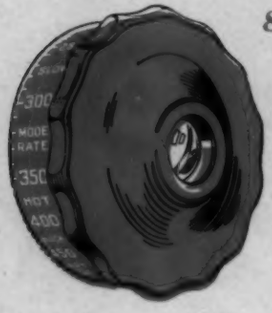
A majority of the equipment purchased for these new homes will be bought or recommended by architects and builders.

To assist Red Wheel dealers to obtain a large share of this new business American Stove Company runs page advertisements in 5 leading building publications, with a combined annual circulation of more than 800,000, *eight* times the total number of architects and builders in the United States.

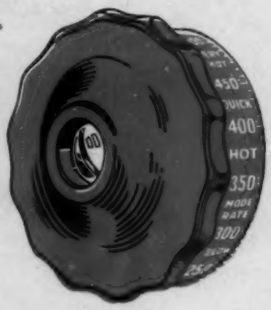
AMERICAN STOVE COMPANY

801 Chouteau Avenue • • • • St. Louis, Mo.

LARGEST MAKERS OF GAS RANGES IN THE WORLD



LORAIN
RED WHEEL



These are the Six Famous Brands of Red Wheel Gas Ranges:
DANGLER · CLARK JEWEL · QUICK MEAL
DIRECT ACTION · NEW PROCESS · RELIABLE

Follow Up Range Customers

(*Continued from page 54*)

to solicit some purchaser of range every time that a new range sale is made. In this way there is always a definite time for doing such solicitation and, of course, all sales effort is most successful when it is definitely arranged for at definite times and when the solicitation is made as planned at the appointed time.

Of course it is also an excellent plan to solicit every range purchaser to buy the entire outfit of gas appliances at the time the range is bought. While the majority of folks will not do so, still this solicitation gives the salesman a chance for seeing just what the customer's needs are with regard to gas appliances. A note can then be made of such needs and this notation can be used with good results later on in soliciting additional business from the range buyer.

And, of course it is a fine proposition for the gas company to constantly emphasize the fact, in dealing with range purchasers, that their credit has been established with the company by reason of their purchases. A good plan along this line is to send out letters to range purchasers reading thus:

"Dear Madam:

"We want you to use this letter as a Credit Reference when buying appliances from us.

"We send this letter to every one of our customers who buys a range from us and who completes the payments satisfactorily.

"When you want to buy an appliance of any sort from us on the installment plan, just bring this letter with you and we will be glad to make arrangements at once without the formality of having you fill out the customary blanks as you did at the time of buying your range.

"Many of our patrons are taking advantage of this credit reference letter in making easy purchases of appliances of various sorts and we will be very glad to have you do the same thing, too.

"Hoping to have the pleasure of serving you within a short time, we are,

"Yours truly,

"A. B. C. Gas Company."

This style of letter pleases most recipients and makes them feel like using the letter at once. Consequently it is quite helpful in building more business for the gas company.

See to it that your company cashes in to the fullest possible extent on range buyers and—do it now!

Berlin Takes its Home Service Work Seriously—And Gets Results

By A. Deane Dowell,

Home Service Counselor, American Gas Association.

WHAT do you think of a Home Service Staff of fifty and the company still saying "We must enlarge our force in order to meet the demands and needs." This is a startling number to most executives and yet the Berlin Gas Company, Berlin, Germany, maintains such a staff.

Director Fredericks of the Berlin Gas Company, speaking before the Convention of the Organization for Gas Utilization in Berlin on December 8, 1928 gave a very interesting sketch of the work of the Home Service Department of the Company. In some respects the work does not differ very greatly from that being done in our own country but many interesting points were brought out that seem new suggestions which might be helpful to every gas company as an aid in building the domestic gas load.

The article as reported in the German "Technical Monthly Information for Gas Sales People," and which was called "Propaganda for Domestic Gas Consumption," has been translated in part.

"Propaganda in a gas company may be divided into many different phases but I shall consider one, Service to the Customer propaganda.

"We of the gas industry have not taken the full advantage of the opportunities in the field of domestic gas use, in that we have not seen that the housewife clearly knows all of the possibilities of its use. Domestic gas brings the largest revenue in comparison to industrial and commercial uses.

"Gas should be the heating source for all household purposes and put in use for all purposes such as the bath, heating, washing, ironing, cooking, warm water preparation and lighting.

"In the Berlin Gas Company we have in our Home Service Department established a staff of fifty girls trained partly by ourselves and partly by courses in gas utilization. With this training and their experience they now stand ready to answer all questions which a housewife may have. A personal call, telephone call or letter will bring one of these girls to the home. With her information she is able to make adjustments of appliances to the satisfaction of the housewife and also bring back to the company knowledge of existing installations in the home, which is turned over to the sales department and followed up. The results of thirty thousand calls of this kind have been very satisfactory and show that it will be necessary to greatly increase the department in view of the amount of work that has fallen on the Home Service Division.

"Gas lectures for housewives supplement the home calls for increasing the per capita consumption of gas. Every Wednesday afternoon we hold in our auditorium a lecture for housewives at which a meal for four is prepared and a cake baked in the bake oven. After the preparation it is served on paper plates with aluminum spoons which carry our legend 'Only With Gas.' While the repast is being made ready to serve, instruction is given by one of the home service ladies about washing and ironing, and a warm water heater is brought out and thoroughly explained. The showing of a film on gas serves for a change.

"Besides this we have regular lectures from fall to spring from ward to ward in the city (Berlin covers a very large area) to explain the use of gas. A meeting hall is chosen where the appliances can be connected. The results are gratifying for we have an attendance of about six hundred and the public notices we receive result in sales.

"At Christmas time we extend the lecture and show practical methods of baking Christmas goodies. All organizations are notified with posters, press notices, mailings and street advertisements. Invitations are sent to schools, churches and leading citizens in the community.

"The organ of our notices to our consumers is a monthly built up around our bill. The last page is the bill.

"In working with the housewife we do not fail to notice the youth, for they will later be the consumers. We therefore go to the preparatory school and have a woman trained to do this teaching. The program consists of the theory and use of gas and electricity in the home and practical experiments in cooking, roasting and baking, keeping in mind the rules for gas saving, etc. We also use moving pictures and lantern slides as much as possible.

"We have to allow considerable thought to easy methods of buying gas appliances and in one year sold approximately one hundred and thirty thousand appliances under the partial payment plan.

"We cooperate with other organizations in selling, installing and adjusting of appliances. One of our Home Service women usually talks before the plumbers organization.

"Prizes in our cooking class consist of tickets of credit for 3,000, 2,000, 1,000 and 500 cu. ft. of gas. When a housewife wins one of these she sends it in with her gas bill and if the bill does not amount to as many cu. ft. of gas as her prize the ticket for the balance is returned to her to be used at another time."

The Home Service Department of the American Gas Association has also received each month a very attractive recipe

card which is distributed by the Berlin Home Service Department, giving some recipe from another country. They call it the "national dish." America has not yet been represented and we wonder whether our national dish will be the traditional *pie*.

Home Service exists in other foreign countries but we do not believe that there is another staff of fifty in either our own or a foreign country, though in London the Department Staff consists of thirty and last year 40,000 calls were made in the home of the customer, giving aid or advice in 30,000 of the homes.

In Australia one director covers practically the entire country.

We are accustomed to think that the gas company of the United States pays more attention to its consumer than any other country but when we see such reports as those of Director Frederick and Miss Ethel Williams of London, we get a different idea.

BERLINER STÄDTISCHE GASWERKE AKT·GES·

GESCHÄFTSSTELLE KREUZBERG BERLIN S42 Gitschiner Str. 48 Postscheck: Berlin 148606

Kassenstunden: 8-14 Uhr; Sonnabends: 8-12 Uhr; Geschäftszeit: 7½-16 Uhr; Sonnabends: 7½-13 Uhr; Fernr.: F1 Moritzpl. 514-16

RECHNUNG

HERRN / FRAU / FRL.

GASVERBRAUCH

vom ___/1. bis ___/2. 1930 Stand cbm

= ___ cbm zu 10 ₰ = RM

und ___ cbm zu ___ ₰ = RM

Gasmessermiete RM

zusammen RM

KASSENZEICHEN

Betrag erhalten

Berlin, den 193

K. ___/___ Buch Blatt

Die Quittung ist nur gültig, wenn sie mit der Unterschrift des Kassierers oder des Gebührbehörs der Geschäftsstelle versehen ist, jedoch bei Scheckzahlung erst nach Gutschrift d. Betrags

Zur Beachtung! Der Rechnungsbetrag wird stets bei der Hausanschluß fällig und ist bei Vorlegung der Rechnung an den Gebührbehörs zu zahlen

In dringenden Fällen außerhalb der oben angegebenen Geschäftszeit ist anzurufen: bis 20 Uhr Sicherheitswache Glinkstr. 48, Fernruf: F1 Moritzplatz 514-516; Nach 20 Uhr u. Sonntags: " Stralauer Platz 32, " E3 Königstadt 240-242

The above Berlin gas bill formed an integral part of a large folder telling the customers about the company's Home Service department

Telling the Public About Gas

MUCH has been said about Gas Companies being dilatory in regard to taking advantage of the Gas Refrigerator as a load builder.

The photograph shown herewith proves that the Portland Gas and Coke Company of Portland, Oregon, cannot be accused of being remiss in this respect.

The very unusual, unique act of bringing a de luxe illuminated billboard into a salesroom created considerable comment from the passers-by as it was about 40 ft. long and 15 ft. high. Comparing it with the height of the young man who is more than six ft. tall, one gets an idea how enormous it looked and with the tremendous flood-lights and spotlights thrown on it, it certainly made a beautiful background.

The billboard is in dark blue with a big moon just coming up behind the castle, and while in the photograph, the words to the left stand out very strong on account of being nearest to the camera, as a matter of fact, they were the subdued part of the billboard. The strongest phrase is "Silent as the Night" while "Gas Refrigeration" above it was in yellow shaded into red.

The colored waiter, impersonated by F. V. Burrill, known as the "King of Dolls," has a record of keeping from blinking for an hour and 57 minutes. This artist, who for weeks had been drawing big crowds to the show windows of the Gas Company, would in this act go to the far icebox, mechanically open the door, take out a tray with small portions of ice cream and gradually shuffle over towards the salesman who would take it from him to serve to the public.

It Pulled the Crowd

Between four and five thousand people were so served, the salesmen being on hand to present the visitors with information and literature on Gas Refrigeration, both Servel and Ice-O-Lator. Thus many prospects were secured and some direct sales made.

As the number of people served was actually kept tab on from day to day, it stands to reason that tens of thousands got the message from the billboard and the performance. The six windows facing on the act generally held say 10 to 30 people each, and as only one or perhaps two from each window could be induced to walk clear around the lobby to come inside, it is safe to say that those on the outside who learned about Gas Refrigeration outnumbered the ones who went on the floor by probably ten to one

Many, many people confessed and are still telling us that they didn't know there was such a thing as Gas Refrigeration.

A gas refrigerator display in Portland, Oregon, that attracted widespread attention and caused much favorable comment

Can This Be the Reason?

By Hylan Piper

IT SEEMS to me," said a manufacturer's representative, "that the utilities have tried everything except to actually merchandise home appliances. I can think of no premium or prize plan that they have not tried and it is getting so that unless the manufacturer has a scheme that includes a free this or a set of that, he might as well save his efforts. It appears very strange that the men who are responsible for merchandise sales and favorable public opinion are so short-sighted. They fail to realize that every time they conduct a premium sale or an added allowance sale or a special cut price sale they are adding coal to the smouldering fire of dealer discontent.

"When you stop and think, can you name any other line of business or any industry that depends so entirely on premiums as the utility company?", he asked,—and to save us we could not recall any other.

Obviously there are two schools of thought on the subject, as there should be; yet it seems that the men who we might say have the true merchandising instinct and desire, are wholly in accord with this man when he says that the utilities are overdoing the premium offers as an aid in selling home labor saving appliances. His point is well taken when he says; "If they would but look about them they would be quick to see that women everywhere are buying all kinds of merchandise at prices that afford both the manufacturer and the retailer a satisfactory margin of profit, for the simple reason that the sellers have bundled it up with an idea; an idea that it is useful, costly, beautiful or that it will be a source of pleasure to her, or a saving, or that it will cause her friends to express admiration."

That is just what the utility man is not doing with his appliance when he offers to give a special premium, for if the article is SOLD for any of the reasons stated above there is no need for an added article to induce the sale.

The same evening this subject was discussed by this sales representative we ran through a batch of daily newspapers to see what the utilities were offering and sure enough the first utility advertisement to meet our eye was one that offered a new type of clothes basket free with each electric iron; another offered a set of glass ware with a waffle iron and still another a set of dusting tools with a cleaner. And then we hauled out a file of clippings and found advertisements offering a set of china, a baking set, a carving set, a composition rug, a combination stool and step ladder, a set comprised of a Hoover apron, a smock and a wash frock; each premium with its big play-up and more reason-why-copy for the premium than that featuring the appliance.

This little research aroused our interest and we decided to dig deeper and make an investigation on our own hook to see if women really looked for and wanted this bait when they purchased home appliances. Accordingly we set out to make a neighborhood survey. This took several evenings but the results obtained from ten calls were enlightening and offered the following results:

1 "Most of those things given with appliances are really of little value, and even smaller utility."

2 "Of course when one is given a premium it is paid for. I prefer to purchase utensils when and as I need them."

3 "Those baking sets are nice, but I've always found that such sets have pieces that I either have no use for or pieces that I already have.

4 "I would prefer to have the cost of such items taken off the selling price of the article. That means more to me."

5 "I never am interested in those sales. I prefer to purchase only the things I need, and I know that when premiums are given I am really purchasing them."

6 "Yes I've bought appliances during a sale when premiums were given but I never put much value in the premiums.

7, 8, 9, and 10 "Suppose those things are all right for some people but, really, they have never interested me greatly. You see one may buy all such articles at a department store for a mere trifle."

Of course this is only a superficial investigation, one of those neighborhood affairs, but it gives a fair indication of the value of the premium as a stimulus to the sale of wanted appliances, and while on the face of it there is an indication of a belief held by the average woman that there is something to that old saying, "you can't get something for nothing," they all, no doubt, had at some time or another taken advantage of a premium offer. However, notwithstanding that fact, they were all more or less agreed that the premiums were not essential to their purchase of the things they desired and had use for.

This brings us back to the sales representative's thought that if the appliance dealers in the utility field would cease to offer premiums and merchandise the appliance on its merits there would be less reason for the whine that conditions call

for some special selling trick. The can-opener era of cooking cannot be overcome in that way, and if the man who has a meritorious appliance to sell will spend as much time, thought and cash in selling the appliance and in inducing his salesman to call on potential users as they do in concocting premium sales more appliances would be sold satisfactorily, and with a more equitable return on the investment.

The time is at hand in a great many cities for week-kneed selling, free this and free that to cease; time for gas men especially to go out and resell the idea of cooking with gas and to sell the advantages of the gas laundry, gas or garage heating, hot water service and incineration; to sell gas as a servant in the home and to glorify the gas range. If you want to learn something about range advertising read some of the electric company's range advertisements. They are no better than the gas range advertisements of fifteen years ago, but electric cooking is new with a great many companies and they are going at it with the same "reason why" attacks that the gas man used when the "cabinet type" gas range and the "enameled" gas ranges were events. You doubtless remember that, and a great many gas men remember how they SOLD gas as commercial managers or managers in a city that offered gas as a fuel for the first time. Tactics used then, polished and fitted up to the glorified gas range of today will cause you to forget the can opener. Try 'em.

An Easter Window Display

WINDOW display advertising may be built around St. Patrick's Day or about Easter, but the latter it is felt, holds the greatest possibilities. Also, since Easter Sunday happens to fall on the last day of the month of March this year, it seems that an Easter window might be an effective display for use during the last two weeks in the month. Henee, there is offered as an idea provoker the photograph of a window which has already been used.

As will be noted this is a very simple window and one that may be built without a large outlay of time or expense. A single gas range, elevated above the window floor, a huge broken egg, (this one was red), a drape of green velour, a white rabbit and a couple of window cards—and the kiddies will make the grown-ups stop —and your range is attractively exposed to the potential purchaser.

Recent Higher Court Decisions Involving Gas

By Leo T. Parker

It is not often that the Supreme Court of the United States renders two opinions in one month of so great importance as those decided this month.

Both of these unusually important cases involve the valuation of property for making gas rates. Since the decisions of the law rendered by this higher Court are readily adopted by state higher courts. I shall explain each point of the law involved so that readers may readily determine the kind of testimony unadapted to influence a Court to allow increased rates, because in both of these cases it was decided that the arguments presented were not sufficiently important to justify allowance of the higher rates demanded. In this manner officials and counsel representing gas companies may avoid presenting unsound testimony as a basis for higher gas rates.

The facts of the most important of these two cases, United Fuel Gas Co. V Railroad Commission of Kentucky, 49 S. Ct. 150, are that the United Fuel Gas Company, a West Virginia corporation, is engaged in the business of producing natural gas from gas fields located principally in West Virginia, which it sells to consumers in West Virginia, Kentucky, and Ohio. A part of its business is the sale of gas wholesale to distributors in West Virginia, and has not been subjected to regulation by any public body. Its local business in Kentucky is subjected to regulation by the Public Utilities Commission. It formerly held franchises for the sale and distribution of gas in various Kentucky cities. However, all of the franchises had expired by July, 1918. Nevertheless, it continued its service in those cities until June, 1923, when it organized the Warfield Natural Gas Company, a Kentucky corporation, whose stock it owns and to which it conveyed its property in Kentucky, and which has since carried on its business of distributing gas in the Kentucky cities.

Before the organization of the Warfield Company, the Public Utilities Commission had ordered the United Fuel Gas Company to reduce its rates 80 per cent. of the former rate of 40 cents per 1,000 cubic feet, less 5 cents for prompt payment.

Promptly after organization of the Warfield Company, it filed with the commission a new rate schedule for the Kentucky cities of 45 cents per 1,000 cubic feet, with a reduction of 5 cents for punctual payment. After an extensive hearing, the commission denied the application, and upheld its earlier order requiring a rate of 28 cents.

Later a lower United States Court fixed the rate at 32 cents per 1,000 cubic feet and ordered the commission not to impose any lower rate.

However, this rate was not satisfactory and both the United Fuel Gas Company and the Warfield Natural Gas Company appealed to the Supreme Court of the United States on the grounds that the decision of the Public Utilities Commission is void under the Fourteenth Amendment of the Federal Constitution because the rate is confiscatory and because the commission's decision, under the Kentucky statutes, is not subject to revision by a Court. The validity of the order was also assailed on the further grounds that the part of it, which required the Warfield Natural Gas Company to continue to render service, violates the Kentucky Constitution, and that the Public Utilities Commission was never consti-

tutionally created, because the Kentucky legislative act establishing the commission is in violation of the Kentucky Constitution, which provides that no legislative act shall relate to more than one subject.

Also, it was contended that the valuation placed on the gas field by the commission was too low.

In commenting on the right of the gas companies to attack the validity of the Public Utilities Commission's decision after appealing to the Courts to increase the rate made by the commission, the Court said:

"This objection to the constitutionality, on state grounds, of the statute creating the commission and defining its powers, are not available to appellants (gas corporation) in the present suit. It is the rule of this Court, consistently applied, that one who has invoked action by state Courts or authorities under state statutes may not later, when dissatisfied with the result, assail their action on the theory that the statutes under which the action was taken offend against the constitution of the United States.....Upon like principle we think that appellants who have procured action by a state commission under a state statute may not assail that action in a federal Court of equity on the ground that that statute, or the one creating the commission, is void under the State Constitution.....As the Court below held, appellants, as public service companies, are bound by the common law, if not by statute, to render their service at reasonable rates. If the rates are not shown to be confiscatory, they cannot complain that the order purporting to impose them was void, for they have suffered no injury even though the order was unauthorized."

Also, the gas corporation contended that since its franchises in the Kentucky cities had expired in 1918, it was not subject to regulation by the Public Utility Commission and that it had the legal right to remove its property and refuse to serve the consumers if the rate was not satisfactory. However, the Court held the gas corporation to be under the control of the Public Utility Commission, because it had continued its business *after* the franchises had expired, saying:

Continuance not Illegal

"In these circumstances its continuance in those cities is neither forbidden nor illegal. It remained subject to state regulation, and control of it is, by state statute, vested in the commission with state-wide authority. If a state may require a public service company subject to its control to make reasonable extensions of its service in order to satisfy a new or increased demand, present or anticipated.....obviously the latter may be compelled to continue to use presem facilities to supply an existing need so long as it continues to do business in the state. The primary duty of a public utility is to serve on reasonable terms all those who desire the service it renders. This duty does not permit it to pick and choose and to serve only those portions of the territory which it finds most profitable, leaving the remainder to get along without the service which it alone is in a position to give. An important purpose of state supervision is to prevent such discriminations.....and, if a public service company may not refuse to serve a territory where the return is reasonable, or even in some circumstances where the return is inadequate but that on its total related business is sufficient,.....it goes without saying that it may not use its privileged position, in conjunction with the demand which it has created, as a weapon to control rates by threatening to discontinue that part of its service if it does not receive the rate demanded."

It also is important to observe that the higher Court refused to increase the valuation placed upon the company property by the lower Court, saying:

"The burden of proving the value of property on which they are constitutionally entitled to earn a fair return rests upon the appellants (gas corporation) and, to justify judicial interference with the action of state officers in fixing the rate assailed, must be supported by clear and convincing evidence. Of the total of 814,910 acres embraced in the gas field, controlled by appellants or subsidiaries, 41,969 acres are owned in fee. The remainder is controlled by lease or contract.....They (companys) urge that their assembled holdings of gas rights are unique, in that they cannot be reproduced and that their value depends largely upon their peculiar nature and situation."

Investments in Non-Proven Lands Not Allowed

It is interesting to observe that in the case of United Fuel Gas Company V Public Service Commission of West Virginia, 49 S. Ct. 157, the Supreme Court refused to allow estimated valuation of non-proven leaseholds, and also refused to increase the valuation shown on the company's books.

In this case the United Fuel Gas Company claimed the valuation of approximately 815,000 acres of gas lands, leaseholds and rights to be $36,449,176. The Court included in the rate base 136,384 acres of proven territory (that is, areas which had been thoroughly tested and are now producing gas), and excluded 126,208 acres of land described as probable territory (that is, territory which had been partially tested or which appeared on the basis of geological evidence and its geographical relation to productive areas to be a probable source of natural gas). The balance of the territory, consisting of 552,319 acres classified as improbable or unfavorable territory, was disregarded by the Court.

The Court held the valuation to be $10,312,311 and explained that it would be inconsistent to base the rate upon assumed valuation, saying that the most dependable evidence of valuation is the value listed on the company's books.

Lease Contract Held Invalid

It is important to know that an agreement to make a contract in the future is no contract at all, because the minds of the parties have not met upon the terms. Moreover, a contract to execute a lease in the future cannot be specifically enforced, unless the terms of the lease are specifically set out.

In other words, to be enforceable, a contract to enter into a future contract must specify all of its material and essential terms, and leave none to be agreed upon as the result of future negotiations.

For instance, in Owens V Wilson, 273 pac. 895, it was disclosed that the owner of land and a gas company entered into a contract by the terms of which the former agreed to lease certain land to the latter as soon as sufficient acreage had been blocked up to warrant drilling a well. Soon afterward the gas company notified the landowner that he had signed up sufficient adjoining land to justify drilling the well.

However, the land owner refused to sign the lease on the contention that the contract in which he agreed to do so was invalid and unenforceable. In holding the contract void, the Court said:

"It is left entirely to his (gas company's) option and to his own statement whether a sufficient amount of acreage had been blocked to justify him in proceeding.....One individual may not retain to himself the option of exercising his opinion in a matter, and at the same time claim an enforceable agreement with the other side. The right to perform must be mutual and the right to enforce must likewise be mutual. If these conditions do not exist in the contract, then it cannot be enforced."

Also, in the leading case of Grow V Davis, 110 Kan. 214, it was shown that a contract provided that a landowner should execute an oil and gas lease, and deposit it in a bank, for delivery to a promoter when the latter should begin drilling a well in a specified locality. The promoter agreed to begin drilling the well but the contract provided that if he did not begin drilling within a stated time, the contract and lease should be of no effect. This Court held that the instrument when signed did not create an enforceable obligation, and the landowner could withdraw at any time before the promoter commenced to drill.

Public Service Commission Without Authority to Invalidate Contract

It is important to know that a Public Service Commission is legally empowered to invalidate or alter contracts made by gas companies, *only* where the effect of such contracts is discrimination between consumers of gas.

This point of the law was considered in Huntington Development & Gas Co. V Public Service Commission, 143 S. E. 357. The facts of the case are that a gas company supplied gas to municipal consumers. This company entered into a contract with a distributor of gas by the terms of which the

latter was required to bear the loss in leakage until its pipe lines were repaired and rendered in first class condition.

The Public Service Commission entered an order disregarding the contract contending that its effect was a discrimination with respect to the distributor's consumers. In its report the commission stated that 10% leakage was figured when the gas rate was allowed.

However, the Court held the commission without the proper authority to invalidate a contract of this nature, saying:

"The commission's power of regulation may disregard any contract deemed to be at variance with the needs of the service as determined by it, or which is discriminatory in character. But is this contract at variance with the needs of the service, or is it discriminatory in character? We are inclined to believe not... Even if we were disposed to agree with the commission that the contract of December was invalid as being discriminatory in character, yet the commission's order would be erroneous it is not apparent from the record that there was any evidence upon which the commission was warranted in fixing the arbitrary 10 per cent. loss in gas leakage to be borne by the gas company. The commission says that from its experience in public service matters it believes such a deduction was proper, and that this probable loss in leakage was taken into consideration in fixing the rate charged. But the commission's belief, drawn from its fund of experience, is not evidence, and an order of the Public Service Commission which is without evidence to support it cannot be upheld by this Court."

Gas Company not Required to Inspect Gas Connections Before Turning on Gas

While it is true that a municipal gas company is liable in damages for injuries resulting from failure of its authorized employes to exercise ordinary care to prevent leakage of gas from its own pipe lines, meters and other apparatus, yet it is also well established that the owner of the property is legally bound to inspect the various connections in his house before ordering the company to turn on the gas.

For illustration, in Lewis V Southern California Gas Co., 268 Pac. 930, a tenant in an apartment building sued a gas company for several thousand dollars damages for injuries sustained as a result of an explosion of gas that leaked from a kitchen stove.

The testimony proved that the tenant filed the usual application for gas service. Soon afterward an employe of the gas company turned on the gas and went into the apartment, to which gas had been turned, and lighted a burner or two to see if the gas was coming through. He did not test the stove or other connections for leaking gas.

When the tenant lighted the stove an explosion occurred causing the injury. The lower Court held the gas company liable, but the higher Court reversed this verdict, saying:

"The general rule requiring the use of ordinary care and diligence on the part of a gas company applies to its delivery of gas into the residence or other building of the consumer. The rule has been laid down, however, that in the absence of any fact upon which to base an inference of duty, the failure of the gas company, on introducing gas into a dwelling, upon application, to inspect pipes or fixtures which were placed there by the owner and over which the company has no control, is not negligence.....If the gas pipes and fittings are the property of the consumer, and there is no contractual duty resting on the gas company to inspect, the consumer, by application for gas service, assumes the burden of inspecting and maintaining the pipe and fittings on his property in a manner reasonably suited to meet the required service, and the company has the right to assume that these duties have been performed by the applicant."

Equipment News

Gas Machinery Company's New Master Control for Water Gas Sets

The Gas Machinery Company of Cleveland, Ohio have developed and placed in successful operation a master control, or timing device for keeping a multiple of water gas sets "in step" while being operated simultaneously in one plant.

The apparatus was designed to meet a growing need in plants where because of small gas connections to the relief holder, limited relief holder capacity, limited steam generating capacity of boiler plants or small blower capacity make it important to equalize as far as possible the demand on the boiler and blower plants, and the flow of gas through the foul main and the relief holder.

The master control functions as a starting device for the motors of each of the "automatic controls" operating the individual water gas sets on the line. The automatic control of each water gas set must be operated by a synchronous motor to insure maintaining the same relative rate of speed of operation for each of the controls, and each motor, and each motor provided with a magnetic switch.

The timing device is designed along the same general lines as The Gas Machinery Company's automatic control for water gas sets, which consists of a timing mechanism mounted on one shaft and revolving in one direction, and the timing disc so arranged that the opening or closing of any operating valve may be quickly and positively varied 1% or any multiple of 1% of the time of the operating cycle.

In an automatic control, which is driven by a ½ H. P. electric motor, the timing mechanism acts on piston valves, which in turn control the flow of water to and from the cylinders actuating the valves of the set.

In the master control the timing device or disc operates a mercury switch which mercury switch in turn operates the magnetic switch of the automatic control motor of each of the various water gas sets.

The motor driven timer cannot start the driving motor of the automatic control of any or all of the water gas sets until the valves of the water gas set are in the proper position for starting and the actuating mechanism of the automatic control is also in its starting position to insure this safety condition.

A mercury switch is operated from the shaft of the automatic control timing disc and this makes it necessary for the operator to rotate the timing disc shaft by hand to the starting position, which on Gas Machinery controls is the point at which the stack valve is opened and all other valves of the set are in a closed position.

With the timing disc shaft in the above described position, the mercury switch will drop into a notch on the rim of the ratchet wheel allowing the mercury to make contact between the two carbon electrodes.

With this contact made the circuit is closed between the magnetic switch and the mercury switch of the motor timer.

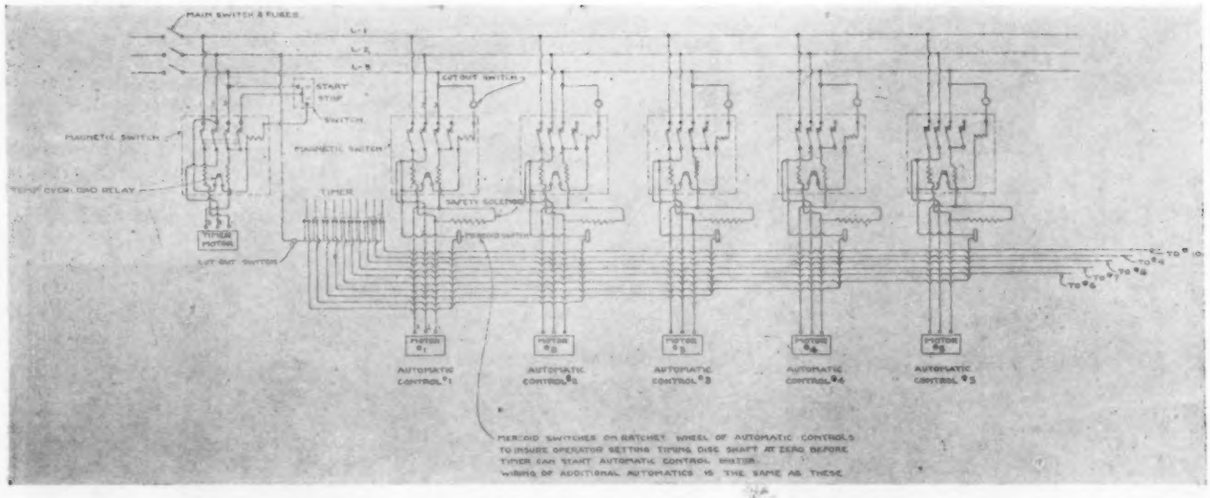
When the mercury switch of the motor timer closes its circuit due to the rotation of the timing disc shaft of the motor timer, circuit is then closed between the main power feed line and the magnetic switch of the automatic control.

The wiring diagram is shown herewith and by referring to this diagram it will be noted that the motor timer is equipped with a magnetic switch, a start-stop push button and an electric motor with a cut out switch.

Also with each of the automatic control motors is provided a magnetic switch cutout switch, mercury switch and safety solenoid.

The cutout switch of the automatic control motor is for cutting the motor off the line at any desired time to permit charging, cleaning of fires or for closing down the machine if its capacity is not required, and the wiring is arranged as above noted so that the automatic control of the shut down set cannot again be started until the timing disc shaft of the set's automatic control has been rotated by hand to its starting position.

The automatic control is equipped with a safety shut down device, which provides in event of an interruption in electric current used for driving the motor, the safety device will automatically cause the automatic control to place all of the


MAIN SWITCH & FUSES
START
STOP
SWITCH
MAGNETIC SWITCH
TIMER
TIMER MOTOR
LOT OUT SWITCH
SAFETY SOLENOID
AUTOMATIC CONTROL
MERCOID SWITCHES ON RATCHET WHEEL OF AUTOMATIC CONTROLS TO INSURE OPERATOR SETTING TIMING DISC SHAFT AT ZERO BEFORE TIMER CAN START AUTOMATIC CONTROL MOTOR
WIRING OF ADDITIONAL AUTOMATICS IS THE SAME AS THESE

Wiring Diagram, Gas Machinery Company's Master Control for Water Gas Sets

valves of the water gas set in a shut down position and the automatic controls of the various water gas sets cannot again be started until the operator has placed by hand the timing disc shaft of the automatic controls in the starting position and has released the safety shut down device, after which action the regular service may again be resumed.

The master timer has never been used with any automatic controls for water gas sets, excepting those made by The Gas Machinery Company but the manufacturers state that this timing device may be applied to any of the various automatic water gas controls as made by other manufacturers, providing such controls are each individually driven by an electric motor to which the various switches and safety devices as described in this article may be applied.

The Gas Machinery automatic control which was originally designed for operating water gas sets running in cycles of 4-5-6- and 7 minutes, has by making a few modifications to the original design, been successfully applied to the operation of oil gas sets, the operating cycle of which is usually 20 minutes or more and the Cleveland Company advise that the master control may also, if desired, be adopted to this service as well.

Oxweld No. 21 High Strength Bronze Welding Rod

An improved bronze welding rod, designated Oxweld No. 21 High Strength Bronze Welding Rod, has been placed on the market by Oxweld Acetylene Company, 30 East 42nd Street, New York City. This rod is recommended for all bronze welding applications including the fusion welding of brass and bronze, bronze-welding of malleable and gray iron castings, joining dissimilar metals and building up bearings and other wearing surfaces. It is stated that due to its composition, it has a uniformly low melting point and easily controlled flow. It produces a weld metal as hard and wear resistant as that formerly made with manganese-bronze rod. By its use, tough and ductile weld metal having a tensile strength of over 45,000 lb. per sq. in. can be produced. This is about 15,000 lb per sq. in. in excess of the strength obtainable with earlier bronze welding rods. In addition, it will make a much stronger bond with ferrous metals.

Properties of this rod it is claimed eliminate almost all boiling and fuming of the weld metal. Annoying fumes are reduced to a minimum and elimination of oxide and gas inclusions is a reason for both the remarkably sound and strong weld metal produced and the better adhesion to iron and steel.

Oxweld No. 21 High Strength Bronze Welding Rod has been thoroughly tested in the laboratory and in the field. It is believed that it will greatly widen the already broad scope of the most versatile of all the oxy-acetylene operations, bronze-welding.

Bronze welded galvanized water line

Compensators Designed for Use in Gaseous Atmospheres

To meet the demand for a hand-starting compensator for use in places where there are explosive gases or gasoline fumes, the General Electric Company has placed on the market such a device, bearing the designation CR-1034-N-52. This is a modification of standard equipment so designed as to eliminate exposed arcing.

The starting switch on this device is oil-immersed. In addition, the usual push-button tripping device is not included in the equipment but, instead, a standard time-delay undervoltage attachment and dashpot relays are used with Cooper Hewitt mercury tubes substituted for the usual contact tips of the dashpot relays. As a result of this arrangement, it is claimed exposed sparking or arcing at contacts is eliminated.

The Barber Automatic Conversion Gas Burner

This burner, as the name implies, is used to convert the coal burning furnace or boiler into an automatic gas heater.

Thousands of homes are equipped with coal fired hot air furnaces, that use gas for cooking, water heating, etc. Many of the owners of these homes would like to use gas for heating, but have hesitated on account of the cost of piping the home for hot water, steam or vapor heat a gas fired boiler. Now these coal fired furnaces and boilers can be converted quickly and economically into gas fired units, by installing a gas burner in the present coal burning heater.

The Barber Automatic Burner was

Showing Barber Burner adapted to furnace

designed to do just this work.

The principle of combustion utilized in Barber Burners is based upon a scientific discovery that develops the hottest flame temperature and highest efficiency of gas burner operating on normal pressure.

The Barber automatic Gas Burner is a very efficient, dependable, and economical house heating machine—backed by many years of experience in heating homes successfully with gas. It is furnished complete with the best known safety and automatic control devices.

The burner is the "power plant" that furnishes the energy that supplies the service for which the appliance is designed. If the burner fails, the service fails with it.

The Barber Automatic Gas Burner is made in sizes and capacities to meet the heating requirements of all types of round or oblong furnaces and boilers —warm air, steam, hot water, or vapor.

Literature and complete details will be mailed on request to The Cleveland Gas Burner & Appliance Co., Cleveland, Ohio.

The Roadless Barrow

The Isbell-Porter Co., Newark, N. J., have issued a leaflet describing the "Roadless Barrow."

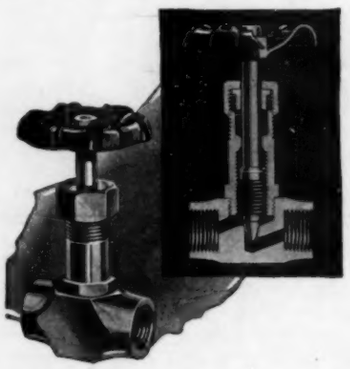
This Barrow makes it possible to carry loads over soft or rough ground where an ordinary wheelbarrow could not be used without the laying of plank runways. It utilizes the caterpillar track principle, which in the "Roadless" design gives the practical effect of a wheel 10 feet in diameter and 3½ inches wide, as shown in illustration.

The track is of neat, strong, and light pressed steel construction and is so designed that the lower portion which carries the load is self-locking on a definite radius. The track is self-cleaning and is not liable to become blocked by grit or small stones, which are ejected.

Over all soft surfaces the effort to push the barrow is far less than that required for an ordinary wheelbarrow, owing to the fact that it does not sink in. It is not restricted to paths, as the loaded barrow will travel easily over dug ground. Its ability to pass over obstructions, door sills, industrial railroad tracks, etc., makes it extremely desirable for use wherever materials have to be moved over soft ground or uneven surfaces.

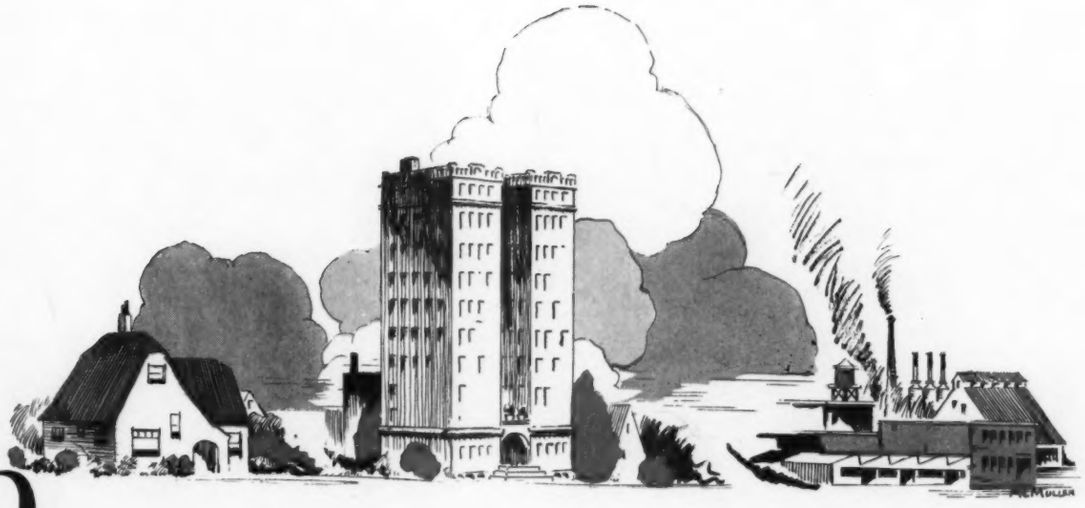
Pratt & Cady Needle Valve

The Reading Steel Casting Co., Bridgeport, Conn., announce the Pratt & Cady Needle Valve, which is particularly suitable for small refrigerating units, measuring devices, and other appliances requiring close control of liquids or gases. The features of the valve are its strength and ability to give long service under severe conditions. The valves can be had in both the angle and globe type.



Coffee Urn Thermostat and Burner

The Johnson Gas Appliance Co., Cedar Rapids, Iowa, have issued a leaflet describing their new thermostat and urn burner designed especially for coffee urns and steam tables. It is of particular interest to restaurants, hotels and cafeterias. It controls the application of heat so that coffee or steam table will have a fixed degree of heat at all times.



Quality Equipment Grows in Importance

The upward trend in gas utilization and consumption continues. Correlative with this sound growth of an industry is the increasing emphasis which is placed on Quality as an inherent part of essential equipment.

Quality Manufacture Throughout — is a first consideration in the purchase of gas meters.

It is insured by the long experience and the unsurpassed facilities that govern production in the factories of American Meter Company.

Other features of construction are presented in the 1929 edition of our General Catalogue. They are of decisive importance in meeting effectively and economically modern requirements for the measurement of gas.

Add to this a successfully executed policy of Factory Specialization in the needs of individual Gas Companies.

The Net Result has been and will be—

Increasing satisfaction with the performance of American Meter Company Gas Meters. They have proved their ability to excel in every department of Gas Measurement Engineering.

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

AMERICAN METER COMPANY
JOHN J. GRIFFIN & COMPANY
HELME & MCILHENNY
MARYLAND METER WORKS
D. MCDONALD & COMPANY
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

Construction Detail

A Type Meter

The description of the A Type Meter has reference only to those parts that are notably different in design and construction from the meter parts presented on pages 11-24.

Channels

The Inlet or Long Channel (*also termed *Ram in the A Meter*) is located above the meter Valve Table so that gas is admitted directly into the Valve Enclosure.

Connecting Channels (**Box Channels*), Diaphragm Channels (**Pocket Channels*) and Fork Channels are of the correct area to accommodate A Type meter capacity. The Fork Channel is constructed in two pieces in order to secure the necessary Gas way.

Fig. 1A

Valve Table with Valve Seats and the centrally located Valve Guides in place. The location of the Inlet Channel above the Valve Table admitting the gas directly into the Valve Enclosure may also be noted.

*In the interest of uniformity in the nomenclature of parts all terms marked with an asterisk are considered obsolete.

Crank Assembly

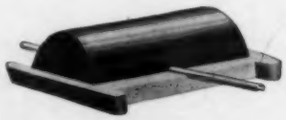
The Crank Arms are raised to clear the Valve Guide Wire which on the A Type meter is centrally situated. They are arched to clear

Showing Construction of Arched Crank Arms

the Valve dome and reach the wrist at the remote end of the Valve. These longer, arched Crank Arms (*Upper and Lower*) are designed to secure close adjustment of the Valves at the four points.

Valves

The ample port openings of the Valve Seat—designed in correct proportion to A Meter Channel Areas, may be noted in Fig. 1 A.



The Valve Guide Wire is centrally located

Other A Meter Parts

Although the other A Type Meter Parts are all specifically manufactured in conformity with A Type design and construction, their difference from corresponding B Type Meter parts is too slight to require a separate description. For Repair Parts please turn to pages 63 to 66

Pages from American Meter

Composite Sectional Photograph of 5-175A *Meter (Open)*

A Type Meters photographed to proportional sizes

Table No. 2.—A Type Meter

Model Denoting Light and Rated Capacity per Hour in Cubic Feet at ½" Differential	Size of Threaded Connections for Iron Pipes in Inches	Size of Plain Connections for Lead Pipe in Inches	Net Weight in Pounds	Approx. Shipping Weight* in Pounds	Height to Top of Pipe in Inches	Width to Outside of Caps in Inches
5– 175A	½	¾	15½	23	16 1/16	12 3/4
10– 375A	¾	1	19½	34½	17 1/8	14 3/4
30– 875A	1¼	1½	46	83	24 7/8	20 3/4
60–1500A	1½	2	128	235	33 1/8	28 1/4
150–3400A	2½	.....	245	395	43 5/8	36

Model	Width to Outside of Screws, Inches	Greatest Depth Inches	Width—Center to Center of Screws, Inches
5– 175A	12 1/4	9 5/8	11 1/4
10– 375A	14 7/16	10 7/8	12 11/16
30– 875A	20 5/8	15 5/8	18 1/4
60–1500A	27 3/4	20 5/8	25 5/8
150–3400A	35 7/16	27 1/8	31 11/16

*The most advisable method of packing and shipping is determined in every instance by the size and the destination of shipment.

Page 8
General Catalogue
Showing arrangement
by Sections

GENERAL CONTENTS

Catalogue G-1 Complete

SECTION I.

Gas Meters for Domestic and Industrial Service
Tinned Steel Case—Metric Iron Case

SECTION II.

(a) Diaphragms.
(b) Meter Connections.
(c) Meter Repair Parts.
(d) The Use and Care of Consumers' Meters.

SECTION III.

Large Volume Measurement.
(a) Linderman Orifice Meters.
(b) Westcott Orifice Meters.
(c) Wet Station Meters.

SECTION IV.

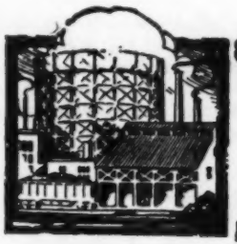
APPARATUS

(a) Apparatus for Laboratory and Experimental Purposes.
(b) Apparatus for Service Requirements.

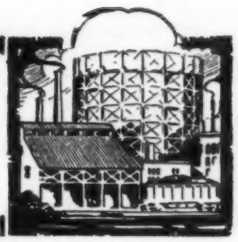
SECTION V.

(a) Recording Demand, Indicating Demand and Empire Limiting Demand Devices.
(b) Demonstration and Glazed Exhibition Meters.

NEW YORK 1836 · PHILADELPHIA 1848 · ALBANY 1855 · BOSTON 1860 · BALTIMORE 1866 · ERIE 1888
CHICAGO 1896 · SAN FRANCISCO AND LOS ANGELES 1901 · KANSAS CITY



NEWS OF THE GAS INDUSTRY



Begins Serving Gas in Two Towns

The Northern Indiana Public Service Company has begun serving Bremen and Nappanee, Ind., with gas from the South Bend plant. In spite of severe weather the work which was begun last October, was pushed to completion. It was the result of franchises which were granted to the company by both towns. The new line was laid from the company's gas manufacturing plant through Lakeville to Lapaz from where it turned eastward to Bremen and thence to Nappanee. The total distance from South Bend to the latter town is about 35 miles. The first section of the pipe line was of 6-inch welded steel pipe and the last sections of four-inch and three-inch pipe.

Boosting Natural Gas

The Public Service Company of Colorado proclaim Natural gas "The Perfect Fuel" and are distributing an illustrated booklet which shows the advantage of natural gas over the old coal burning furnaces in the basement and making time payment offers for arranging the old furnace so that it may be used with natural gas.

Attention is directed to the fact that you get all the fuel you desire without re-ordering. It is clean, no ashes, dust and the whole premise is free from smudge, and of course there is no need to visit the basement to replenish the fire. The cost ranges from $55 up to $156.50, all depending upon how many of the most modern improvements are wanted, and the conversion work can be done in one day.

Concerning Gas Land Permits

Walter Spencer, register of the United States Land office, Denver, Colorado, has been apprised by Washington that many of the people who were given grants for gas and oil permits on government land have failed to carry out the law, and that is to do a certain amount of work to prove or disprove the land and unless a satisfactory explanation can be given the grants will be cancelled. This is the law and it is understood when the land is accepted.

MARCH

12-14 Oklahoma Utilities Association. Annual Meeting, Oklahoma City, Okla. E. F. Mackay, Oklahoma City, Okla., manager

14-15 Illinois Gas Association, Annual Meeting, Springfield, Ill. George Schwaner, 305 Illinois Mine Workers Building. Springfield, Ill., secretary.

21-22 Conference, Accounting Section, American Gas Assn., Chicago, Ill.

APRIL

3-5 Distribution Conference, Technical Section, American Gas Association. Boston Mass.

10-11 Pennsylvania Gas Association. Annual Meeting, Benjamin Franklin Hotel Philadelphia, Pa. G. L. Cullen, Harrisburg, Pa., secretary.

15-17 Mid-West Gas Association, Annual Meeting, Minneapolis, Minn. A. W. Schmitt, Mid-West Gas Association, Des Moines, Iowa, secretary.

24-45 New Jersey Gas Association Annual Meeting, Trenton, N. J. Louis Stoecker, 80 Park Place, Newark, N. J., secretary.

25-26 Annual Meeting, Gas Section, Empire State Gas & Electric Assn., Niagara Falls, N. Y.

6-10 Convention, Natural Gas Dept., American Gas Assn., Kansas City, Mo.

6-11 Exposition of Chemical Industries, Grand Central Palace, New, York City.

Heed Affiliates With American Gas Journal

Mr. James T. Heed has been appointed Western Manager of the American Gas Journal and American Gas Catalog with offices at 53 W. Jackson Blvd., Chicago, Ill. Mr. Heed has had a wide experience in trade paper work and will be glad to render efficient service to advertisers desiring to cover the manufactured and natural gas fields

Rockford to Erect Scales House for Coke Handling

The Rockford Gas and Electric company has announced plans for the immediate construction of a scales house to facilitate handling of increased coke output of the gas plant. William S. McMasters, manager of the division, said the new unit will cost $8,000. Since the battery of new Koppers oven was put into service the plant has yielded 180 tons of coke daily, more than 150 tons of which are adaptable for domestic use; five or six tons are "breeze" coke used in the boiler room of the plant and the remainder pea coke used to make producer gas to heat the ovens. The quality of coke equals that manufactured for domestic use and a ready market has been found locally for the product, Mr. McMasters said. Two new scales, each with weightograph, which gives instantaneous illuminated readings of loads, in contrast with the lever readings, will be installed.

To Celebrate Advent of Natural Gas

At a called meeting of the Princeton, Indiana Community Club, it was voted unanimously to stage a celebration on the occasion of turning natural gas into the mains of the Princeton Utilities Company shortly after the first of March. Mayor William S. Ennes, chairman of the board of directors of the community club urged such action.

The matter of rates for natural gas were discussed informally. Rates will be fixed later by the Indiana public service commission. The Hope Engineering Company constructed the mains from the Francisco gas field to Princeton. Work on the construction was recently begun and has progressed rapidly in spite of uniformly cold weather.

Alkaline Soil Injures Gas Pipe

Alkali in the soil at Grand Junction, Colorado, played havoc with the gas pipe, but after many tests the Public Service Company of Colorado, think it has solved the problem. A specially coated steel gas main was laid. The coating which is held in place by a specially treated cloth will resist the corrosion which the alkali has been causing.

Quarter Century Club of New York Consolidated Holds Annual Dinner

With more than six hundred of the 802 members present, the Quarter Century Club of the Consolidated Gas Company of New York and its affiliated gas companies held its annual dinner in the grand ballroom of the Hotel Roosevelt on February fourteenth. The members of the Quarter Century Club have been in service of their respective employing gas companies at least twenty-five years. One member acknowledges fifty-nine years.

George B. Cortelyou, President of the Consolidated Gas Company of New York, was the presiding officer and among those at the guest table with him were many prominent gas company executives, including John W. Lieb, Vice President of the New York Edison Company; Eugene H. Rosenquest, President, and William J. Clark, Vice-President of the Westchester Lighting Company; W. P. Holcombe and J. C. Parker Vice-Presidents, Brooklyn Edison Company, Colonel Oscar H. Fogg, Colonel John Stilwell and William Cullen Morris, Vice-Presidents of the Consolidated Gas Company and Lewis Gawtry, President of the Bank for Savings, representing the board of trustees of the Consolidated Gas Company.

At the close of the dinner, Mr. Cortelyou made a short address in which he emphasized the significance of the dinner and the presentation of meritorious medals to gas company employees, who while off duty had performed heroic deeds resulting in the saving of life and property and through the American Gas Association the distribution of sixteen medals given by Mr. Thomas N. McCarter, President of the Public Service Corporation of New Jersey, to men who had saved lives through the operation of the Prone Pressure System.

Walter R. Addicks, Senior Vice-President of the Consolidated Gas Company, was chairman of the committee on awards and presented the meritorious service medals.

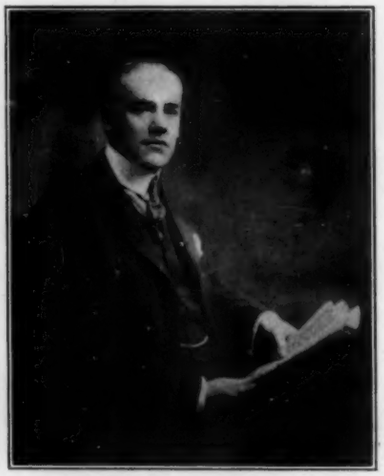
W. Greeley Hoyt, President of the New Amsterdam Gas Company presented the McCarter medals and Henry M. Brundage, Vice-President of the Consolidated Gas Company, presented gold and enamel club buttons to sixty-four men and one woman.

J. E. Zimmerman Chosen President of U. G. I. Co.

At a recent meeting of the Board of Directors of The United Gas Improvement Company, Mr. John E. Zimmermann, chairman of the Executive Committee, was elected to the office of president, agreeing to assume the additional duties pertaining thereto without any obligation to continuing the same for an indefinite period.

Mr. Zimmermann will continue as Chairman of the Executive Committee.

Mr. Zimmermann, who is fifty-five years old, has been prominent in Philadelphia engineering circles since 1899. After serving with the American Pulley Company for eight years, he became associated with Charles Day in the engineering and construction firm of Day & Zimmermann, Incorporated, of which he was president for a number of years. He was elected a member of the Executive Committee of The United Gas Improvement Company on November 14, 1928, and on December 4, 1928, he was chosen chairman of that body, thus becoming the chief executive officer of the company during a leave of absence granted Arthur W. Thompson, president. Mr. Thompson subsequently resigned.



J. E. Zimmermann

To Construct Two Loops in Natural Gas Pipe Line to New Orleans

Plans for the construction of two loops in the pipe line that carries natural gas to New Orleans from northeast Louisiana were recently announced.

One of the loops will extend five miles from Wisner to Gilbert and the other 20 miles from Thompson Creek to Baker Canal, north of Baton Rouge.

The links, are intended to fortify the main line against possible interruption by breaks in the line.

The line, it was said, has a capacity of about 100,000,000 cubic feet daily, and is now operating at about this amount.

Rumors that the entire line would be parallel were denied.

Bill Requiring Employees to Show Identification

Under the provisions of a bill recently introduced in the Assembly by Carl Deutschmann, Democrat of Queens County, New York, a new section 5-c is added to the Public Service Commission Law, requiring employees of telephone, telegraph, gas, electrical and steam corporations called on to enter premises of another in course of employment to be suitably uniformed and to wear badge and carry identification card.

J. J. Quinn Elected President of New England Gas Association

At the Annual Meeting of the New England Gas Association in Boston, Feb. 6-7, Mr. J. J. Quinn, President, Citizens Gas Light Company, Quincy, Mass., was elected president of the Association for the ensuing year.

Other officers elected were as follows: first Vice-pres., H. Vittinghoff; second Vice-pres., M. B. Webber; Directors-at-large, Merle Abbott, and E. E. Eysenbach; Treasurer, F. D. Cadwallader.

Mr. C. D. Williams is Executive Secretary of the Association.

Personals

C. A. Luther, Asst. General Manager of the People's Gas Light and Coke Co., of Chicago, will supervise the assembling of the Gas Section at the Chicago Ninth Annual "Own Your Home" Exposition, to be held from April 27 to May 11.

George Wehrle, superintendent of the Public Service Company of Colorado, gas department, says that it has not been necessary to place its booster in operation, along the Amarillo-Denver natural gas pipe line, that the gas is reaching the City of Denver under a pressure of 148 pounds to the square inch, is stepped down to 38 and sent along to its customers with only a loss of about two pounds in the various feeders, and then the gas tests 830 btu, or thirty units above requirements.

This statement is made after three months of cool weather, some of the nights registering sub-zero, and E. R. Meyers, city supervisor corroborates all Mr. Wehrle says.

T. B. J. Merkt, industrial engineer of The Brooklyn Union Gas Company gave an illustrated lecture on February 25, to two assemblies of four hundred students of the Brooklyn Evening High School No. 15. In the course of his talk on "The Manufacture and Preparation of Food in Brooklyn," Mr. Merkt pointed out the fact that there is an important ally to the 15,000 workers who help in the production of these foods.

"Gas," said Mr. Merkt, "is the skilled worker with never a holiday, who adds its constant, controllable and reliable heat to the various operations which make the food industries of Brooklyn of such value

(*Continued on page 74*)

A GRAND SLAM for January 1929

WE plead guilty. We know that an organization of our size—with our international connections—should announce this wonderful news with appropriate dignity,—lots of staid looking type and conventional ornaments. But today we just cannot do it. When—after putting lots of good work behind a good product, January sales come right back labeled "One hundred per cent increase over January, 1928"—we simply must permit a little justified enthusiasm to our Gas Water Heater Department.

To you—the event is scarcely of lesser importance because Welsbach Self Action Water Heaters can help increase your sales, too.

All Welsbach Water Heaters may be had with or without safety gas shut-off and temperature-pressure relief valve.

WELSBACH COMPANY, Gloucester City, N. J.

Welsbach

Member of American Gas Association

HOTZONE

SELF ACTION STORAGE GAS WATER HEATER

Personals

(*Continued from page 72*)

and importance not only to the residents of the Borough itself, but to those of the country at large and other countries as well.

K. B. Mills was recently transferred to the Arkansas Valley Gas Company as superintendent. Mr. Mills was employed in the operating department at Arkansas City, in March, 1922. Later he was moved to El Dorado as engineer for that property, and after a time was given charge of some of the smaller towns of the Western Distributing Company. He is a World War veteran, was a commissioned officer, and is a graduate of the engineering department of the Chilocco Indian Agricultural School, Chilocco, Oklahoma.

A. D. Whittaker, formerly Superintendent of Gas Production, will be Engineer of Gas Production of the Georgia Company. Other changes in personnel in Atlanta are as follows: A. H. Winberry formerly Superintendent of Gas Distribution will be Engineer of Gas Distribution Georgia Power Company.

E. C. Kollock, formerly Assistant Superintendent of Gas Distribution, will be Assistant Engineer of Gas Distribution of the Georgia Power Company.

C. E. Minchener, formerly Chief Cadet Engineer of the Gas Distribution Department, will be Assistant Engineer of Gas Distribution, Atlanta District.

In addition, the following changes became effective as of February first:

Charles Leach, formerly Superintendent of Gas Department, Macon Gas Light Company, will be Supervising Engineer of Gas Operation of the Macon Division.

Lindsey Roberts, formerly Assistant to the Superintendent of Gas Distribution, Atlanta, will be Results Engineer, Macon District.

Joseph Milner, Foreman of Gas Department at Brunswick, Ga., will be Superintendent of Gas Department of the Brunswick District.

Clare N. Stanard, vice president and general manager of the Public Service Company of Colorado was named a member of the honor committee while J. E. Loiseau, secretary of the Public Service Company has been named general chairman on arrangements for the Gardner airplane race, Denver to St. Louis May 28. The winner will receive $750 and be eligible to contest in the race from St. Louis and return, first prize $5,000.

Ed. C. Pfenning, Manager of the Joplin Gas Co., has a record of nearly 20 years of continuous service with the Doherty company. He first started in the gas business while going to school in Joplin, his old home, and after holding a number of jobs in the organization returned to Joplin last year as manager of that com-

Clarence L. Kirk, vice president and general manager of the Citizens Gas Company of Indianapolis spoke recently on the phases of managing the company at a dinner of the National Association of Cost Accountants in the Indianapolis Chamber of Commerce.

Alba H. Warren has recently been appointed vice president and general manager of the Houston company, succeeding W. A. Raymond.

Mr. Warren will assume his new duties March 1. Previous to taking up this new work, he was a district manager of the Stone & Webster properties in Georgia and Florida, with headquarters at Savannah, Ga.

Mr. Warren has been in the public utility business for 21 years. A resume of his activities during this time is as follows:

Manager of the Pensacola Electric Company at Pensacola, Fla., 1908-13; manager Galveston Electric Company, Galveston Tex., 1913-1918; manager El Paso Electric Company, which also did the lighting and railway business in El Paso, Juarez, Mexico, and surrounding communities, 1918- 1925; with Stone & Webster, 1925-1929.

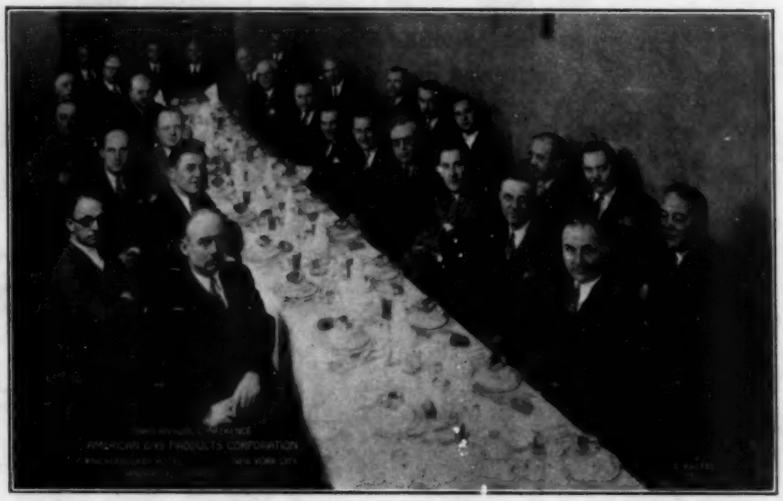
Trade News and Construction

American Gas Products Corporation Hold Annual Sales Conference

The Third Annual Sales Conference of American Gas Products Corp., was held in New York City at the Hotel Knickerbocker on January 30th, 31st and February 1st. New products were exhibited and thoroughly gone over and a very comprehensive advertising campaign, both direct by mail and magazines, was explained and shown.

A visit was paid to the Institute of Thermal Research of the American Radiator Company, at which place the men became acquainted with the thoroughness with which new developments on Ideal Gas Boilers are worked out.

The annual dinner was held at the Hotel Knickerbocker on the evening of Friday, February 1st.



Brown Instrument Company Changes Location of Buffalo Office

The Buffalo, N. Y., office of The Brown Instrument Company, Philadelphia, Pa., is now located at 402 Marine Trust Building, having recently removed from 624 Ellicott Square. Mr. O. B. Wilson has been placed in charge of the company's Cleveland, O., office, 819 Hippodrome Building. Mr. Wilson has been with the Brown Instrument organization over 5 years and has had extensive experience in serving the needs of instrument users from the home office and in the New York sales territory.

Shallcross to Inspect Coke Plants In Europe

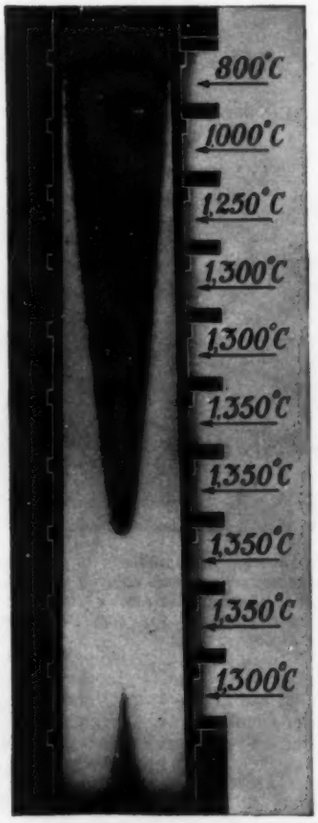
W. M. Shallcross is sailing on March 14 for two months in England and on the Continent. He is inspecting several coke plants equipped with Shall cross Regulators, and will study the problems of gas control that are met with in foreign coke oven practice.

Changes in Sprague Meter Co., Representation

T. H. Gronberg is now representing the Sprague Meter Co. in the states of

(*Continued on page 76*)

GLOVER-WEST
Vertical Retorts



The Retort Setting

consists of combustion and circulating chambers built horizontally across the lines of retorts.

The distribution of temperature over the length of the retort can be varied and adjusted to an unlimited extent, so that whether "steaming" is practiced much or little, or not at all, *the Retort can always be correctly heated.*

WEST GAS IMPROVEMENT CO.

Builders of Coal Gas Plants

441 Lexington Ave. New York

TRADE NEWS

(*Continued on page 78*)

Michigan, Indiana, and Ohio. Mr. Gronberg has been in charge of the Davenport branch for some time past.

E. M. Lockwood, Jr., from the Bridgeport office has taken charge at Davenport.

Columbus Heating & Ventilating Company Move Into New Home

The Columbus Heating & Ventilating Company, Columbus O., manufacturers of gas fired hot air house heating furnaces, have moved their offices and plant from 425 W. Town St., to 400 Dublin Ave. This company had outgrown their old plant, and their capacity in the new plant is increased 80 percent.

Lambert Meters Contain Semi Chrome Tanned Diaphragms

The gas industry has shown a keen interest recently in semi chrome diaphragm leather.

The Lambert Meter Company announces that they do and can supply meters with semi chrome tanned diaphragms. They can also supply diaphragms for repairs out of semi chrome leather.

The leather used is from nationally known tanneries and must meet rigid chemical and physical specifications.

The Lambert Meter Company continues to supply bark tanned diphragms also.

United Engineers & Constructors Inc. Activities

The Tampa Florida Gas Company is preparing to install a naphthalene scrubber system at its plant.

The installation will include a 9'6" x 35'0" Naphthalene Scrubber with 24" steel connections and by-pass, also the necessary oil pumping equipment for the scrubber.

The development of The Tampa Gas Company's business makes this addition to its equipment imperative, in order that the best service may be rendered its consumers.

In addition to work recently done for the Concord, N. H. Gas Company, the U. G. I. contracting company is now improving one of the 6 ft. sets by the addition of a 7 ft. generator, with angular reverse steam connections, hydraulic operation and Model "B" Automatic Control.

Semet-Solvay Engineering Corporation to install welded steel purifier at Fond du Lac—Other contracts received.

The Wisconsin Power and Light Company has purchased a Steere welded steel purifier for its plant in Fond du Lac. The purifier has three compartments and is 20' x 54' x 12' 6" in size. It is provided with a gantry crane and a 16" manifold of Steere welded steel pipe. Two layers of trays of the new patented Wellington type are also being furnished.

The Minneapolis Gas Light Company has equipped two 11' water gas machines with Backruns making a total of three Backruns on this company's plants.

The Cia Cubana de Electricidad, of Havana, Cuba, has placed an order for a 5000 gallon capacity R. S. DeEmulsifier. This apparatus will be installed in the company's gas plant in this city for the dehydration of tar emulsions.

A Steere welded steel purifier with new type trays has been erected for the Alabama Power Company's Montgomery plant. The box is equipped with a gantry crane for operating the oxide doors.

Portions of the water gas plant of the Lewiston, Me., Gas Light Company are being remodeled. Among the items of construction included in the program are a new fuel handling system; a Backrun for a 7' water gas machine; considerably new plant piping, 16" and 20" in size; changes in the blast system, new oil sprays and various other items.

New Water Gas Plant at Independence, Mo., Provides For Increased Gas Making Facilities

Bird's eye view of the plant, showing the purifiers and tar and liquor separating in the foreground, the machinery room, cooling scrubber, relief holder, generator and boiler room, boiler stack in the center, the water cooling tower, the condenser for high pressure gas and the coal handling trestle in the background

THE new water gas plant recently placed in operation by the Jackson County Light, Heat & Power Company at Independence, Mo., occupies a new site favorably located with reference to the center of distribution and railroad facilities. This site afforded every advantage of arrangement and up-to-date equipment, and the general layout was decided with a view to economies in operation as well as making for simplicity in the future expansion of buildings and equipment.

The old gas works was situated on a plot adjoining the grounds where the Latter Day Saints had recently erected a new temple and in order to facilitate the development work undertaken by the church as well as to meet the demand for increased manufacturing facilities, the owners, the Metropolitan Gas & Electric Company, of Chicago decided on a new plant site.

Mr. J. C. Markley of the Chicago office is the Engineer for the Purchasing Company and The Machinery Company, Cleveland, were the general Contractors for the new plant.

The main building is designed to house boilers on one side and water gas sets on the other. An overhead fuel bin for both generator and boiler fuel is provided across the center of the building and fuel is handled from a track hopper under the railroad siding by Godfrey Conveyor equipment, designed to permit handling fuel directly from the receiving pit under the cars to the overhead bin, to yard storage, with provisions also for recovering from yard storage to the overhead bin when desired.

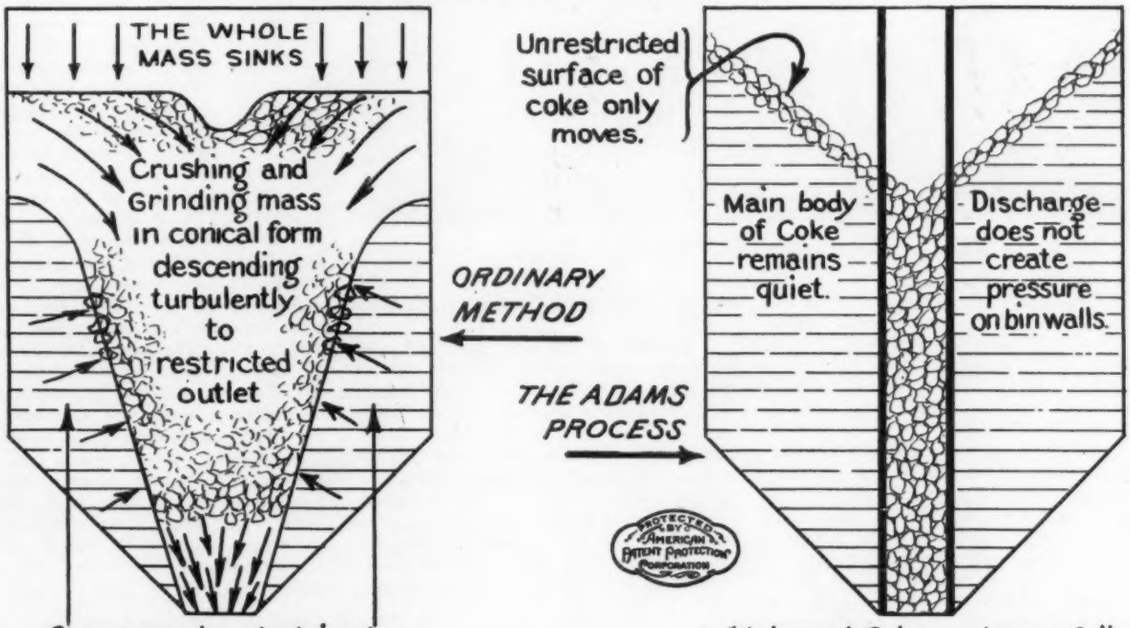
The initial installation in this building consists of an 8' water gas set with Cooler Gas connections and complete automatic control. Sufficient space is provided within the building to receive

(*Continued on page 78*)

Coke and Coal Breakage Reduced
Uniform Mixture of Sizes Assured

COMPARE THESE TWO METHODS OF BIN DISCHARGE

WRITE FOR FURTHER PARTICULARS


THE WHOLE MASS SINKS
Crushing and Grinding mass in conical form descending turbulently to restricted outlet
ORDINARY METHOD
THE ADAMS PROCESS
Unrestricted surface of coke only moves.
Main body of Coke remains quiet.
Discharge does not create pressure on bin walls.
PROTECTED BY AMERICAN PATENT PROTECTION CORPORATION

Compressed and retained by wedge pressure
Note: Shearing and grinding action at wedge face.
A similar action is taking place throughout the descending mass.

Withdrawal Column always full.
Quiet descent of Coke.
Reassembling of coke sizes automatically occurs.

THE ADAMS PROCESS

ALSO A PARALLEL ACHIEVEMENT IN BIN FILLING.

EATON–KENT INC.

Engineers and Manufacturers

Specialists in flow control and breakage reduction in the handling and storing of coke, coal and other friable materials.

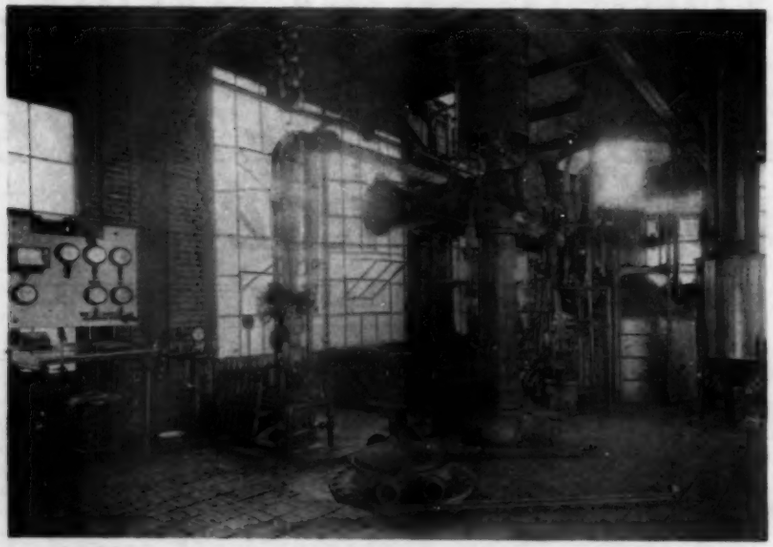
Boat, car and truck loaders **Storage bin discharge and withdrawal equipment**

17 ACADEMY ST., NEWARK, N. J.

New Water Gas Plant

(*Continued from page 84*)

at Independence, Mo., occupies a new a future 8 or 9′ set. A breeze collector is provided on the superheater stack to insure cleanliness.



Interior of generator house, showing breeze collector and automatic control

At the boiler end of the building are two Heine water tube boilers, one as a spare, and each equipped with Detroit stokers. The boiler stack is 5′6″ inside diameter and 130′ high. Water purification plant for the boilers was supplied by the Permutit Co.

The gas from the water gas set discharges into a 60,000 cu. ft. capacity steel tank relief holder which is so designed that a second lift to double its capacity may be installed when required.

The gas is pumped from the relief holder by steam driven No. 6 Roots exhauster and between the exhauster and the relief holder is located a cooling scrubber 4′6″ in diameter by 35′ high with which is provided an outside decanter or separating tank for receiving all of the overflow from the scrubber. Circulating liquor is pumped from this decanter by two steam driven piston pumps, one as a spare, which force the liquor thru five stands of cooling coils, each made up of 2″ tubes 20′ long and 40 pipes high and from these coils the liquor is discharged into the sprays in top of the scrubber.

Handling Cooling Water

A water cooling tower is provided over the coils with a concrete basin under the coils, and steam driven piston pumps are used for recovering the cooling water from the receiving pit and discharging same to the water cooling tower from which it again passes over the cooling coils.

From the exhauster the gas is pumped thru a P. & A. tar extractor of the inner seal type and from thence to the purifiers.

Two purifiers are included with the new plant, each 20′ in diameter by 12′ high, built for duplex operation and equipped with gas manifold for reversing the boxes. The boxes are also equipped with reversal valves for changing the direction of the flow of gas thru the oxide.

A purifier of the same size and general construction which is located at the old plant will, in time, be moved to the new plant and attached to the valve manifold system of the new boxes, Foundation to receive the third purifier is provided at the new plant.

From the purifiers the gas is returned to the machinery room where it is metered by a Roots positive displacement station meter and from this meter it discharges to the main storage holder which is a 3-lift steel tank construction of 400,000 cu. ft. capacity and was built under contract with the Stacey Bros. Gas Construction Co. of Cincinnati, O., who also furnished the relief holder.

A portion of the gas from the plant is distributed under high pressure and a new compressor is provided in the machinery room for handling this gas, and a foundation prepared to receive the compressor from the old plant which will then serve as a spare.

In the gas piping layout provision is also made to receive a duplicate exhauster for which foundations are built and the spare exhauster will be moved from the old plant.

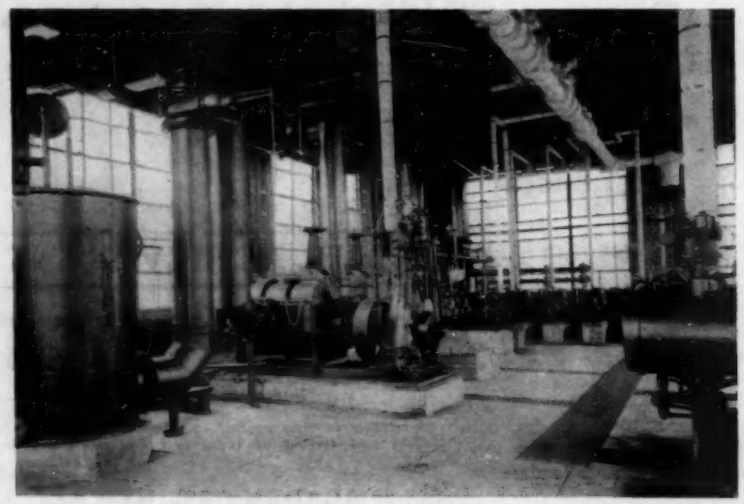
Provision for Additional Equipment

In one end of the machinery room is located a battery of steam pumps to serve the enclosed hydraulic pressure system for operating the hydraulic valves of the water gas sets, for circulating the liquor thru the cooling scrubber and coils, for circulating the cooling water from the reservoir under the coils to the water cooling tower, as well as pumps for handling oil from tank cars to storage and from storage to the sets and for handling tar storage well to tank cars for shipment.

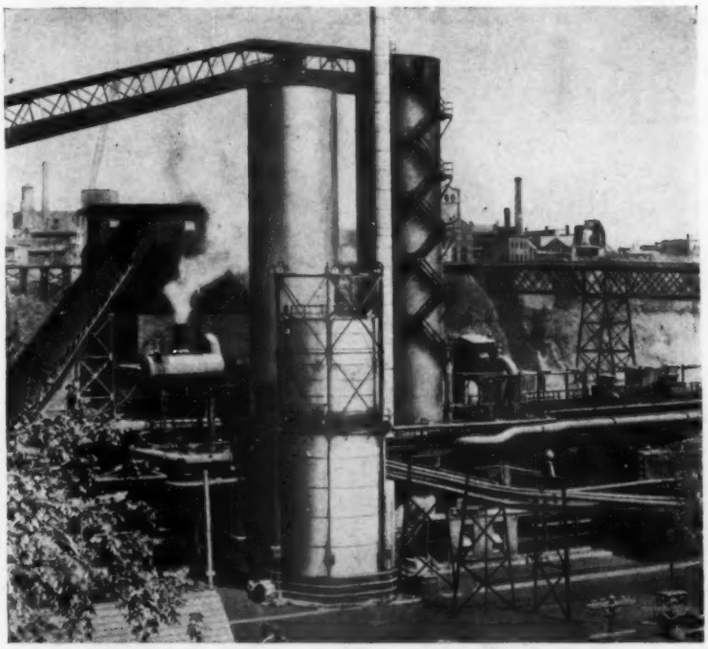
The piping arrangement for these pumps is so arranged that a spare pump is always available for any service.

All gas piping is of welded steel construction with Van Stone joints and designed to insure automatic drainage to the tar and liquor separating tank.

The tar and liquor separating tank, built of concrete, is of very generous size to provide for separation of the extra tar resulting from the bituminous coal which is used exclusively in the generators. The final clear liquor from the separating tank is pumped to the reservoir under the liquor cooling coils and this furnishes the makeup water for the cooling tower.



Steam pumps, exhauster and piping in the machinery room. Note orderly arrangement and foundation for additional exhauster



Section of West Station, Rochester Gas & Electric Corp., Rochester, N. Y.

PROTECTION THAT ENDURES

Wherever *enduring* protection is desired against rust, rot and decay, there the need will be met most satisfactorily with CE-CO Technical Paints, which are designed for the requirements of the gas industry.

CE-CO Technical Paints were selected by the Rochester Gas & Electric Corp. for the preservation and decoration of many buildings and other structures at their various plants (a small portion of one of which is shown in the above illustration), because of their experience with these paints over a period of many years. CE-CO paints are also in extensive use by many other well known public utilities because of their known dependability.

The exceptionally severe conditions at Rochester, which are typical of the gas industry, are being successfully combatted with CE-CO Technical Paints, even in locations where ordinary paints soon perish, such as on concrete coal bunkers, conveyor sheds, tanks, etc., subjected to heavy steam and fumes from the coke quenching plant.

The viaduct in the right background, owned by the city of Rochester, also the Drake coal storage bin and practically all of the buildings of the Curtice Bros. Co. nearby, are likewise protected with CE-CO paints—graphic evidence of our ability to supply the correct paint for the conditions encountered.

Send for descriptive literature and color card 3-A.

TECHNICAL CE-CO PAINTS

CHEESMAN-ELLIOT COMPANY, INC.

Established 1876

TECHNICAL PAINT MAKERS

639-647 Kent Avenue - Brooklyn, N. Y.

Works at Brooklyn, N. Y. and Williamsport, Pa.

Topics of Major Importance Discussed at Pacific Coast Conference

Many of the Industry's Leaders Contribute to the Success of the Meeting

THE meeting of the Executive and Advisory Committees of the American Gas Association at Los Angeles, February 6th and 7th, resulted in an exposition and discussion of a number of important problems confronting the Gas Industry.

Those in attendance were extended a generous welcome to the Pacific Coast and the city of Los Angeles by C. H. Dickey, President, Pacific coast Gas Association, and F. S. Wade, Vice-president, Southern Counties Gas Company, Los Angeles.

Eliminating Distance Barriers

In his opening remarks, Oscar H. Fogg, President, American Gas Association, recalled the cordial reception accorded at the last meeting on the Pacific Coast, held in 1925 in San Francisco. He spoke of the phone, airplanes and other agencies and their tendencies to bring extreme sections of the country closer together in point of time and otherwise.

"The barriers of distance," said President Fogg, "are being rapidly levelled, and we, as an industry, realize that differences in methods and practice, logical enough in the past, are melting away before the influence of new forces, that are shaping the life and thought of the entire nation. To us, there is a further incentive to enlarge our horizon, for the natural and manufactured gas industries have united their interests and activities in one national association, and problems hitherto somewhat sectional in character are no longer of divided interest or concern. There is but one gas industry."

C. H. Dickey
President, Pacific Coast Gas Association

Hall Analyzes Competition

Speaking for the Pacific Northwest, in the symposium, "Nation-Wide Survey—Present Conditions and Future Possibilities," E. L. Hall, Gen. Supt., Portland Gas & Coke Company, Portland, Oregon, referred to the competition of cheap wood, mill waste, saw dust, low priced coal, cheap oil, and electricity.

"Wood products in their various forms," said Mr. Hall, "still represent the greatest domestic source of fuel. The by-products of our lumber mills are frequently delivered to the householder at but little above the cost of cartage. Of considerable importance in this connection, is the recent perfection of the sawdust burner, releasing and making available an unbelievably cheap source of fuel for heating homes. The one redeeming feature concerning the sawdust competition is that the supply is limited. This is, however, not true of mill waste in the form of slabs, waste lumber and box wood."

"The coal situation likewise presents a formidable picture owing to the large quantities of cheap, low grade, high ash, coals which are offered freely at prices as low as $7.50 to $10.00 per ton. Neither has the coal situation been improved from the standpoint of the gas industry by the introduction of mechanical devices for stoking coal in domestic furnaces.

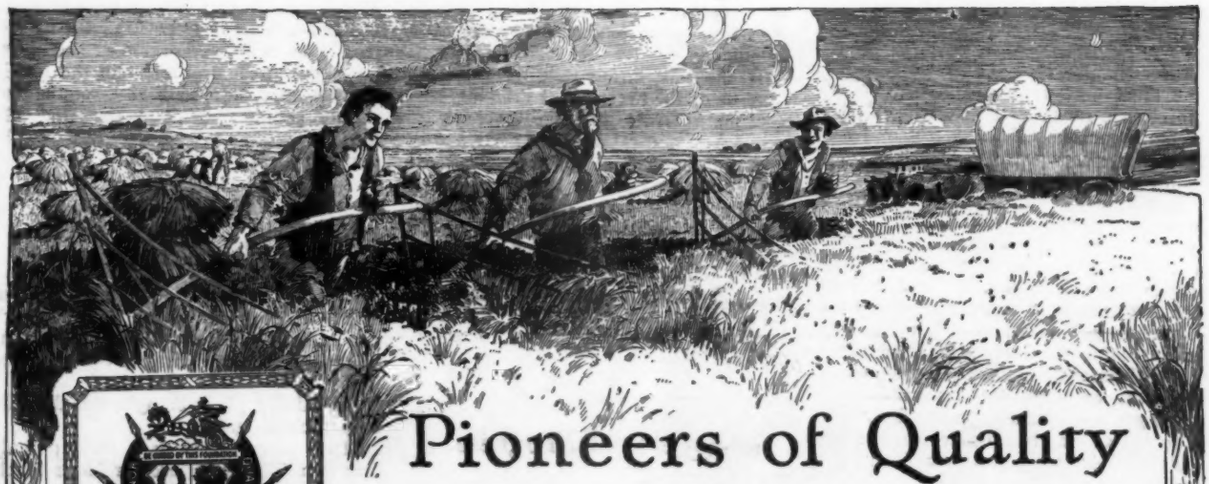
"At the same time, the overproduction of oil in the California fields and the policy of the large oil companies to merchandise oil at retail prices but slightly higher than paid by the large consumer, has enabled the householder to heat his home through many of the automatic oil burners now on the market at a minimum of expense and a maximum of convenience.

"Recapitulating the solid fuel situation the two factors that are making competition from this source in the Northwest more acute may be summed up as being first, the over-production of these fuels tending to very low prices, and secondly, the recent development of mechanical devices for utilizing such fuels efficiently and conveniently thereby robbing gas of one of its biggest advantages.

"Fortunately, however, for the gas industry the competition from the above sources is not well organized or directed and the main disadvantages of solid fuel or inherent to solid fuel, are still largely present. At the same time the mechanical devices are expensive, not altogether free from hazard and are complicated and require a good deal of maintenance.

"The attack that electricity makes upon gas is largely psychological. The appeal to the housewife is in being up-to-date. With our modern gas ranges having everything of beauty and convenience and much more of economy and speed it is hard to see where the electric range offers to the housewife any real advantage. But

(*Continued on page 82*)



Pioneers of Quality

Emblem of
BUSINESS CHARACTER
Rice Leaders of the World Association
Represents High Standing in
NAME-PRODUCT-POLICY

Every manufacturer—whether he makes face powder or gate valves—has two policies to choose from. He must conform his product to meet a price or build it up to a set standard of quality.

Darling Valve makers chose the latter policy and have adhered to it from the beginning in spite of price competition and increased cost of manufacture.

If you pay a little more when you buy a Darling Valve, you pay a lot less thereafter for maintenance and repair. If you exercise more care in the selection of valves you do a lot less worrying about production tie-ups and the yearly loss from leakage.

You know what **quality** means in watches, automobiles or human beings. It's equally important in valves—and only in a Darling will you find the many refinements that assure long life, ease of operation and tight seal.

Write for Catalog of the complete line of Darling Gate Valves.

DARLING VALVE & MFG. CO.
Williamsport, Pa.

New York Chicago Oklahoma City Houston

DARLING
GATE VALVES

Pacific Coast Conference

(*Continued from page 80*)

one must always remember that behind the electric range is the electric industry highly organized, efficiently managed and assisted by propaganda with which the gas industry has been unable to cope.

In concluding Mr. Hall said "the gas industry throughout the United States cannot afford to allow the enemy to gain a foothold in any one section of the country and that it behooves the American Gas Association to study carefully these conditions and to this end I venture to offer to this conference the suggestion that a General Committee be appointed to study the economics of competition between gas and electricity and to determine in so far as may be possible the peculiar fields in which these two great industries may best serve the public at a minimum cost and with maximum profit to themselves."

Natural Gas to the Fore

In contributing to this Symposium Henry C. Morris, President, Dallas Gas Company, spoke of the vast contribution Natural Gas is making to manufacturing industries and the industrial upbuilding of the South. He called attention to the relatively long distances Natural Gas is being piped and the large cities that already enjoy the benefits of this fuel and also additional large cities that will have Natural Gas in the near future.

Mr. Morris also touched upon the sound financial status of the Natural Gas Industry.

Sales Conditions

"Are Sales Conditions Different?" by Clyde H. Potter, Chief Commercial Agent, Southern Counties Gas Company, dealt with a meaty discussion of the efforts the Gas Industry should make to get its share of the consumer's dollar. It also discussed sales conditions attending the various appliances in many sections of the country.

"It is not enough," said Mr. Potter, "to advertise our business today and assume that we will always remain favorably intrenched in the minds of the consumers. The public will remain gas minded or gas conscious only so long as we keep ourselves before the world. The minute we decrease our advertising appropriation, our new business budget, just then we are losing our position in the eyes of the gas consuming public.

"A Radio message to the woman of the house in her own home, bill board copy before the motorist as he travels to and from his place of business, constant newspaper advertising telling of the convenience and moderness of gas are tried and sure methods of pushing the gas frontier further and further into the territory of our competitor. That advertising must be one of our most fundamental weapons is certain.

"If the sauer-krout industry can convince us of the necessity of drinking each morning, a glass of this beverage, if corned beef and cabbage, formerly a very plebian dish, fit only for the privacy of one's home, can be marketed on the dining cars of all de luxe trains, if William Wrigley, through the generous use of advertising, can create a demand for his gum in Boise, Idaho; Tampa, Florida, or in the Philippine Islands, then surely the gas industry can make itself the most dominating factor wherever heat is required."

Agencies of Progress

Addressing the meeting on the above subject Alexander Forward, Managing Director, American Gas Association, stressed the importance of the Gas Industry collecting data and facts insofar as they would have a bearing on the forward progress of the Industry.

He stated that research had been the "outstanding development in American Gas Association activity in the past two years."

Other important factors discussed by Mr. Forward were concerned with the importance and growth of the Laboratory at Cleveland, the matter of gas mixing, and salesmanship and advertising. In connection with salesmanship he said.

"The other under-development in our salesmanship is lack of adequate sales outlets through cooperation with dealers and others."

Advertising Teamwork

E. H. Bauer, General Manager, Worcester Gas Light Company, spoke on "The New England Plan of Cooperative Advertising" and gave as some of the main reasons for such advertising scheme the following:

1—To make the people gas conscious

2—To stop the loss of the domestic load

3—To retrieve some of the business that has been lost to competitive fuels

4—To create new markets

5 To create an interest in better and more efficient gas burning appliances, thereby again increasing the use of the appliance with an increase gas consumption per customer.

Mr. Bauer outlined the method of carrying out the advertising campaign, stating that $150,000 was appropriated for advertising and that approximately 80 per cent of the 1,300,000 meters in New England were represented in the scheme. Also, the appliance manufacturers were called upon to contribute an amount equal to one percent of their net sales with the gas company.

"It was decided," said Mr. Bauer, "that we would not have a good-will campaign. None of the Advertisements were to hinge on good-will or service. Many of us felt that good-will and service had been stressed a great deal and that the Public today wanted something very specific and if they got the real thing, the good-will, the appreciation of service, etc., would come of itself."

Research

In the absence of H. C. Abell the paper "Research Program of the Gas Industry" was read by H. E. Bates, Chairman, Technical Section, American Gas Association.

Mr. Abell's paper brought out the following observations:

"It is plain that it is a most difficult task to pick those research problems which are most important to the gas industry. From my viewpoint I think the most intensive study should be given to sales of gas, improving the load factor, etc., which of course means more application to the subject in today's program besides much more concentration on many other problems which are not purely technical. The technical research must go along with the other problems and as aggressively, but as we have our present investment, production methods and costs, distribution and other factors controlling the present ultimate cost to the consumer, I believe we should concentrate as much as possible to improve the uses of gas based on our present conditions and then keep working diligently and aggressively to improve the fundamental conditions, affecting all costs of heat delivered to the prospective and present customers."

Underground Storage of Gas

S. W. Meals, President Carnegie Natural Gas Company, Pittsburgh, in his paper, "Storage and Measurement of Large Volumes," remarked as follows:

"Re-pressuring the sands for recovery of oil has given the gas industry much valuable information as well as a new market for surplus gas. Storing natural gas in partly depleted sands is a practice that has been carried on for a number of years by several of the larger companies in the East. However, for certain reasons, very little information has been given to the public as the practice has been an operating convenience rather than a program of conservation.

"The record of one company covers a period of over ten years and, with an ideal storage reservoir found in a formation less than 1000 feet in depth, covering an area of about 27 square miles with some eighty wells, they have stored over 8,000,000 M cubic feet. The gas was purchased from another company and stored during the summer months. When the

(*Continued on page 84*)

THIS NEW BOOK *Contains* A SIMPLIFIED B. T. U. METHOD *of Calculating Steam Radiation*

Clow heating engineers have just completed a 48 page book that contains clear, concise facts and figures on residential, commercial, and medium-sized public building heating problems.

In it is shown a method of calculating radiation, which retains the accuracy of the B. T. U. method, with the simplicity of the Mills Rule. Actual problems are worked out in the fullest detail with this method.

If you are interested in any way with gas or heating, you should have this free book for your reference library. Fill out and send the coupon today.

JAMES B. CLOW & SONS
201-299 N. Talman Avenue, Chicago, Ill.
At no cost to me please send me your new heating book.

Name .....

Address .....

Occupation .....

TABLE OF CONTENTS

	Page
Introductory	2
Advantages of Gasteam Radiator Heating	3
Radiator Construction and Operation	4-5
Radiator Prices and Ratings (Unvented)	6
Radiator Prices and Ratings (Vented)	7
Application of Vented and Unvented Radiators	8
Roughing-in Measurements and Data	9
Installation—Specifications and Instructions	10-11
Methods of Running Vent Stacks	12
"Ventum" Oval Stack Pipe and Fittings	13
"Ventum" Oval Vent Stacks	14-15
Miscellaneous Vent Stack Details	16
Tile Vent Stack Details	17
Specifications for Ventum Stacks	18
Specifications for Tile Stacks	19
Mechanical Venting System	20-27
Gasteam With Room Temperature Control	28-29
Combination Gasteam Heating	30-31
School Heating and Ventilating	32-34
Recessed and Concealed Radiation	35
Method of Calculating Radiation Required	36-41
Test Data on Air Conditions, Etc	42-43
List of Gasteam Distributing Points	44

JAMES B. CLOW & SONS — 201-299 North Talman Avenue, Chicago

CLOW GASTEAM

A.G.A. Approved. Listed and Inspected by Underwriters' Laboratories

STOCKED IN EVERY SECTION OF THE COUNTRY

Pacific Coast Conference

(*Continued from page 82*)

company started injecting gas, the rock pressure was 26 lbs. It was found that to raise the rock pressure one pound required 218,000 M cubic feet and if this amount was taken out, reduced the rock pressure one pound. The pressure on the sand now is about 70 lbs. It would certainly require a flock of holders such as our friend, Mr. Mullaney, inaugurated at Chicago in December to store this volume of gas.

"Our friends at Buffalo, New York, have made use of underground storage for a number of years, which has been of inestimable value in meeting the severe winter load. The gas was purchased in the Pennsylvania field when it was available during the summer months and stored. This storage field is located near the town of Concord in Erie County, New York, about thirty miles south of the city of Buffalo. There are 23 wells now used for storing gas, located within an area of eight hundred acres. The average depth is 1900 feet. The first well was drilled in 1888, having a volume estimated at 18,000 M cubic feet with 600 lb. rock. In 1916 the rock pressure had declined to 48 lb., when the company began storing gas. The greatest amount stored at any one time was about 300,000 M cubic feet but 2,681,199 M cubic feet has been stored and used out as needed since June, 1916. With 50 lb. differential over line pressure 10,000 M cubic feet per day can be taken out.

"Butler, Pa., has not known a shortage of gas, but an ideal operating condition due largely to one well in which gas is permitted to feed when the line pressure is built up. As the load decreases and the demand draws on the service, the gas stored in the well automatically supplies the demand.

"In our operations in supplying the steel mills with natural gas, we have a well which has been in use in like manner as the well referred to at Butler, for almost twenty years. The well is located near Pitsburgh and connected with a 24" pipe line to the mills. This gave a prompt response to any peak demand. Five years ago we injected gas from a high rock pressure well into this well, building up the pressure from 40 lb. to 90 lb.

"You may be familiar with the report by J. L. Dwyer in the December, 1927, issue of 'Oil and Gas Journal,' of the Tidal Oil Company's operations in storing surplus or tail gas from the Burbank field in a shallow sand on their Osage lease in Oklahoma. The depth of the sand was 928 feet with an initial rock pressure of 290 lbs. When gas was delivered from this field—to the drilling wells—withdrawal of 975,813 M. cubic feet of gas from the wells caused the pressure to decline from 290 lbs. to 123 lbs. and 135,000 M cubic feet more withdrawn caused a further decline in rock pressure to 93 lbs. When re-introduction of gas began 158,000 M cubic feet injected increased the rock pressure from 93 lbs. to 128 lbs. The withdrawal of 135,000 M cubic feet caused the rock pressure to drop from 128 lbs. to 93 lbs.

"Gas trapped in the sand is often released by re-pressuring as proven by the experience of one company in Texas. Lean gas was metered into practically an exhausted sand. After injecting gas sufficient to increase the rock pressure 35 lbs., the gas was withdrawn and they report recovering 30% more gas than was metered into the sand; also, the lean gas had picked up hydrocarbons from the sand which enriched it over 30%.

"The sugestion and message I wish to bring to the industry is that we should have close cooperation between the gas and the oil operators in properly protecting producing sands, with a view to using partly depleted sands for storage; that large volume gas wells, when the sand is free from water, should be protected and NOT PLUGGED when the gas is depleted, but retained for storing purposes."

Manufactured Gas Developments

"Manufactured Gas Technical Developments," by C. J. Ramsburg, Vice-president, The Koppers Company outlined a number of high lights in improvements of gas-manufacturing technology. In part the paper read as follows:

"To my mind the outstanding improvements in production methods during the past few years have been as follows:

1. Liquid purification with and without sulphur recovery, simultaneously removing hydrocyanic acid, when present.
2. Development of a practical cheap method for gas dehydration.
3. Development of efficient low-cost naphthalene removal.
4. Adoption of back run method.
5. Complete automatic operation of water-gas generators, including mechanical continuous clinkering grate and automatic charger.
6. Becker oven with producer-gas and blast-furnace-gas heating.
7. Disposal of phenolic waste liquor.

"While there are other matters which might be mentioned in connection with these, I know of nothing which may be classed with these seven major outstanding developments.

Additional papers and addresses were presented by Bernard J. Mullaney, A. F. Hockenbeamer, W. A. Sauer, Floyd Parsons, F. C. Freeman, R. E. Fisher, C. O. G. Miller, Leroy M. Edwards, A. F. Bridge, W. S. Yard, and C. A. Munroe and R. G. Griswold.

At the close of the conference the following resolutions were offered by F. A. Lemke and J. S. DeHart, Jr., respectively.

Resolutions offered:

"RESOLVED, that the Conference considers the vital problems of the gas industry, here developed and discussed in an able and comprehensive manner by our speakers and those who have participated in the discussions, should have the earnest attention of the industry's national organization, and accordingly recommends to the Executive Board that these subjects, including retention and development of the domestic load, conservation and storage of natural gas, advertising, sales outlets, utilization of new products, should be further intensively considered, either at the next Conference in Atlantic City, May 31-June 1 next, or in such other manner as the Board shall deem best.

"RESOLVED, further, That the research and merchandising programs of the American Gas Association have the hearty approval of this Conference."

"RESOLVED that the Conference of the Advisory Council and Executive Board of the American Gas Association hereby records its thanks and appreciation to all those who have given so liberally of their time and thought and generous hospitality to make this Conference a success, and is especially grateful to the Chairman, Mr. F. S. Wade and the other members of the General Committee on Arrangements and Program; to the distinguished President, Mr. Charles H. Dickey, and the efficient Secretary, Mr. Clifford Johnstone, of the Pacific Coast Gas Association; to the Chairman, Mr. Norman McKee and his associates on the local Arrangements and Entertainment Committee; to Western Gas and the other trade press; to Messrs. H. B. Macbeth, A. B. Day, S. F. Hockenbeamer, C. O. G. Miller, W. F. Raber and other executive heads of the Pacific Coast companies; to Mrs. Wade, Mrs. McKee and the other members of the Ladies Reception Committee and to all others including those contributors to the program, who have helped make this Conference not only a success, but an event, especially to the men and women from the East and the Middle-West."

The following were present at the meeting: E. H. Bauer, H. R. Basford, F. H. Berens, H. E. Bates, Wm. Banthye, A. H. Bridge, C. B. Babcock, W. H. Barton, C. C. Brown, K. R. Boyes, C. N. Chubb, R. W. Campbell, C. H. Dickey, Wm. Dickey, A. B. Day, J. E. Davies, J. S. DeHart, Jr., O. H. Fogg, F. C. Freeman, Alexander Forward, R. G. Griswold, E. L. Hall, J. H. Hartog, Geo. Hommer, Samuel Insull, Jr., Clifford Johnstone, Geo. Jones, G. R. Kendoll, S. G. Krake, H. O. Loebell, F. A. Lemke, B. J. Mullaney, H. C. Morris, E. P. Mellikan, N. L. McKee, S. W. Meals, H. S. Masser, D. G. Martin, C. A. Munroe, G. E. McKana, Donald MacArthur, L. H. Newbert, F. N. Naylor, F. H. Payne, B. S. Pederson, C. H. Potter, Floyd Parsons, F. C. Packer, A. E. Peat, B. H. Parkenson, A. E. Robertson, R. T. Richards, W. I. Raber, J. W. Reed, J. B. Redd, C. J. Smith, W. A. Sauer, A. F. Staniford, S. Singer, C. N. Stan-

(*Continued on page 86*)

Old Daddy Steam
Does Your Heating Perfectly
Let Old Daddy Steam
Do Your Elevating Perfectly

Steam pipes don't get out of order
Steam pipes don't kill anybody
Steam pipes don't spark and burn you out

THIS IS WHY THE BIG ENGINEERS AND MILL BUILDERS GET RIDGWAY ELEVATORS.

The Ridgway Elevator always functions so long as the boiler does not blow up.

The Ridgway Elevator is not touched from one year's end to the other.

If oiled occasionally the Ridgway Elevator is as perfect after 5 years as when new. Tight valves and tight piston.

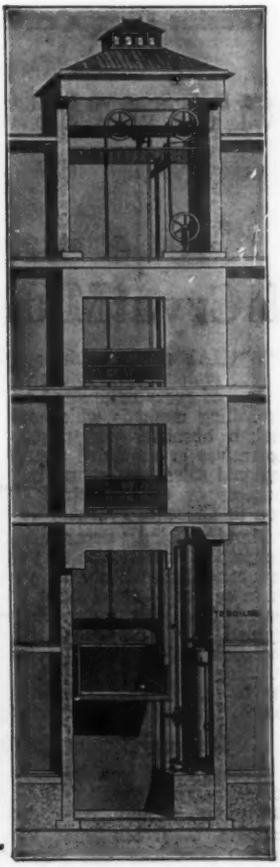
ASK ANY STEAM HYDRAULICKER of which there are now many hundreds all over the world.

The man who has steam available makes the mistake of his life if having steam and needing an elevator he does not

"HOOK 'ER TO THE BILER"

Direct Acting

Double Geared



Craig Ridgway & Son Co. Coatesville Pa.

Elevator Makers to Folks Who Know **Over 3000 in daily use**

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms

SUPERIOR METER CO.
167 - 41st Street
Brooklyn, N. Y.

Pacific Coast Conference

(*Continued from page 84*)

nard, D. L. Scott, W. R. Thompson, F. S. Wade, G. E. Weeks, S. D. Weiss, B. G. Williams, H. L. Whitelaw, Frank Weiss, W. G. Yard, Mrs. Donald MacArthur, Mrs. A. F. Staniford, Mrs. H. O. Loebell, Mrs. E. H. Bauer, Mrs. F. A. Lemke, Mrs. C. N. Chubb and son, Mrs. S. W. Meals and daughter.

"Modernize our Merchandising" Is Cry at Mid-West Sales Conference

THAT the gas industry awaken to a realization of intensive competition of every nature and scrap many of its selling methods which still linger although obsolete, was urged by leading executives at the third annual Mid-West regional sales conference, held under the auspices of the American Gas Association in Chicago, February 14 and 15.

Merchandising departments of gas companies must realize that they are facing conditions widely at variance with those existing only a short time ago, declared Maj. Alexander Forward, Managing Director of the American Gas Association. He referred to increasing acquisition of luxuries by all classes and the change in buying habits brought by long-time installment opportunities.

Mullaney Points the Way

Although the gas industry was once an engineering business, it is now dominantly—or should be— merchandising business, B. J. Mullaney, Vice-President of the American Gas Association, told the conference. Re-adjustment to cope with this new trend is a problem and requires the thought and energy of the best merchandising and advertising brains, in his opinion.

Trying to make salesmen out of those who have not the ability is the commonest and most flagrant error in gas-merchandising organizations, he intimated, and must be corrected if the gas industry is to compete successfully with the other systematically organized merchandising enterprises which are bidding for public responsiveness.

Placing any kind of limit on a salesman's compensation is another principle not consistent with good merchandising practice, he warned, and declared "There should be no limit to a salesman's compensation as long as he sells the goods."

He maintained that, probably as a by-product of its engineering domination, gas industry advertising places too much stress on the specifications of appliance construction when the lay mind is neither interested in them nor capable of fully appreciating them. The public is interested in, and receptive to, primarily what the appliances will do and comfort, cleanliness, convenience and similar talking points should be stressed.

The gas industry is twenty years behind the times in attempting to secure public attention, in the judgment of C. D. Williams, Executive Secretary of the New England Gas Association, who made an appeal for co-operative advertising and modern, more intelligent advertising in general with much larger appropriations.

No other form of advertising can take the place of the lack of co-operative advertising, he said. Even though local company advertising is increased, it lacks the breadth of appeal and continuity to make the impression regional and national advertising creates, he feels.

Liberal use of free trial installations, using employees to secure prospects and sacrificing merchandising profits to obtain desirable additions to gas load were the outstanding general sales principles urged by almost all those who presented and discussed papers.

Mark-up should be determined not upon the amount of merchandise profit desired but should be kept as low as is consistent with what the company is willing to pay for the load, in the opinion of M. B. Buckley, Kansas City Gas Co., Mo. He also advised offering discounts when two or more appliances are bought by the same customer at the same time.

Opinion was divided on whether seasonal or all-year-'round selling of water heaters is more effective. Periodic selling, done intensively over a period of weeks, was recommended by some who maintained that salesmen lose interest in the line after a length of time. Others maintained that the cumulative effect of constant repetition in sales and advertising effort has a better effect upon public consciousness.

Intelligent market analysis, carefully selected prospects, "hand-picked" lists for direct-by-mail campaigns and the use of practically all collateral sales and advertising aids were urged as essentials.

Of greatest significance in the discussion of house heating was evidence that more companies are now marketing conversion burners. No objection to their efficiency was reported and many advantages were offered. F. M. Rosenkrans, Gas Service Co., Kansas City, Mo., said that, although gas designed installations should be the ultimate aim, conversion burner installations do not defeat that purpose in that they teach the advantages of gas heat to many who otherwise would shy clear of gas heating service because of higher initial cost.

Owners of conversion burner installations immediately become live prospects for gas designed installations when a new heating plant is needed. He cited the fact that offering conversion burners enables the gas company to advertise that, "There is a type of gas heating equipment to meet YOUR requirements", and advised a rental plan, especially attractive to those who do not own their homes.

C. H. Kallstedt, Western United Gas and Electric Co., Aurora, Ill., made a plea for more advertising of gas house heating and based the need on the fact that manufacturers of oil burning equipment have so impressed the public through large advertising expenditures that they think first of oil when considering automatic heat.

Most of the trouble with gas-operated refrigeration is now past history, according to reports of most Mid-Western representatives.

H. C. Wandas, The Peoples Gas Light and Coke Company, Chicago, reported that of the 941 automatic refrigerators placed in service by the Peoples company in 1928, only three were removed at the request of dissatisfied customers.

He attributed what small misunderstanding that exists concerning the merit of gas refrigerators to the fact that housewives are not sufficiently informed about their characteristics to make intelligent use of them.

Self Delusion

Mr. Wandas believes the refrigerating load is well worth developing, because, although comparatively small, in many cases where the customer is in the unprofitable class, it is sufficient to bring his consumption up to a profitable basis. In addition, he feels that the magic appeal of refrigeration by gas, creating as it does the impression that gas has some of the wizardy of electricity, is worth all the effort required to acquire a general public consciousness of it.

Gas companies that are not merchandising kitchen ranges as vigorously as other appliances in the belief that range sales are merely replacements and have no load-building value are self-deluded and missing opportunities to add materially to their gas sales, according to C. A. Luther, of the Chicago gas company. He told of a survey in that city, the results of which prove his theory.

Mr. Luther selected at random 589 sales of ranges and analyzed cooking facilities that existed in the kitchens these ranges were bought to serve. One hundred and eighty-one ranges replaced old gas stoves with oven linings rusted out or oven burners unserviceable, many of the latter having been unused for as long as six years. In 63 of the cases one or more top burners on the old stove were not in working order. Combination coal and gas ranges, with the coal burning facilities supreme—many without gas heated ovens—were replaced in 36 of the instances. Fifteen coal ranges were replaced; 30 hot plates; two electric ranges; and one kerosene stove. And 209 purchasers of new gas ranges were new householders or from out of the city.

Five hundred delegates attended the conference and, although the Mid-West Regional Sales council comprises only the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin, there were representatives from twenty states from throughout the country.

The popularity of these conferences is attributed largely to the fact that ample time is allotted after each paper to open discussion and free questioning. Col. Oscar H. Fogg, President of the American Gas Association, who was present and spoke at the opening session, lauded the program and general plan and arrangements of the conference.

BRASS PIPES— COPPER BOILERS

To allow a customer who has gone to the expense of using brass pipes in his building to install a galvanized iron water heater, is not good business. Such a man *knows* the value of brass and copper, and can readily be sold a Copper Kompak.

Thousands of such homes are being built today all over the country. Let your salesman cash in on this nation wide demand, by selling Kompak Copper Water Heaters, wherever he finds brass pipe, and you have best served both your customer and yourself. There is a tremendous potential trouble free market for those willing to make the effort.

Yours very truly,

THE KOMPAK COMPANY

H. J. Long,
President.

No. 300-R

• • BARBER • •

PATENTED

AUTOMATIC GAS BURNER

Manufactured by

The CLEVELAND GAS BURNER & APPLIANCE Co.
Cleveland, Ohio

The BARBER Automatic Gas Burner

Every home owner in your community is your immediate prospect for the Barber AUTOMATIC Gas Burner. Show him that its installation does not mean the junking of his coal burning boiler or furnace and that it is not expensive—and a sale is made.

The Barber AUTOMATIC Gas Burner offers the greatest number of home owners just what they want—at the lowest initial cost. Thousands of prospective customers are ready to enjoy the advantages of the Barber AUTOMATIC Gas Burner, if they know its merits, utility and economy. Its value is already firmly established with gas companies and heating engineers who constantly specify these efficient automatic heating units. Wherever a Barber Burner has been correctly specified and installed, an efficiency of from 75% to 82% should be obtained.

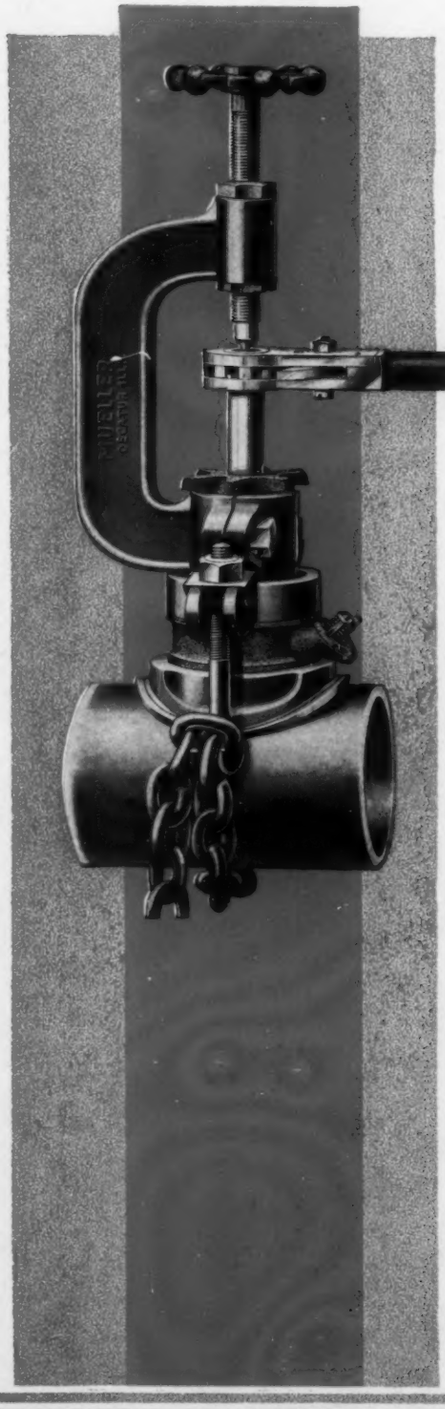
There is a Barber AUTOMATIC Gas Burner for every type of home—large or small, and there is plenty of business waiting for you in your immediate territory. We offer a tried and tested product at the right price. A modern laboratory and an organization of expert heating engineers are at your service. Our co-operation will help you build a profitable sales volume on Barber Burner installations.

Write for latest literature giving complete prices and specification on automatic equipment for special Barber Burner assemblies listed in our catalogue No. 28.

The CLEVELAND GAS BURNER & APPLIANCE CO.

Burner Specialists

3102-04 Superior Avenue, Cleveland, Ohio



MUELLER design

means "an extra margin of satisfactory service"

Made to work on the pipe from any angle, Mueller Gas Tapping Machines are designed to give the utmost in results with a minimum of physical effort. The "L" Tapping Machine illustrated is for use on mains ⅜" to 2" inclusive, under pressure.

Because of Mueller's association with this phase of gas utilities since the early beginnings of the industry, Mueller Tapping and Drilling machines are exceptionally well fitted to the conditions under which they must always be used. The intimate knowledge that such close contact with practical every day problems has given Mueller designers and workmen is your assurance of *an extra margin of satisfactory service* when you purchase Mueller equipment.

MUELLER CO. *(Established 1857)* **Decatur, Illinois**
Branches: **New York, Dallas, San Francisco, Los Angeles**
Canadian Factory: **MUELLER, Limited, Sarnia**

MUELLER

A request will bring complete information on the full line of Mueller gas supplies—

This Good Black Pipe Stays Good Black Pipe

SMITH PIPE IS PICKLED *for* REMOVAL *of* MILL SCALE

It is pickled by a Smith Method just as it is made by a Special Smith Method.

A. O. Smith Engineers have solved the problem of pickling pipe, so that the steel is *unaffected* and all traces of the pickling solution removed.

A. O. Smith Engineers have solved this problem just as they have solved many other troublesome problems for the oil and gas industry.

The result is that SMITHWelded Pipe stays good black pipe because in its manufacture:

The steel is pickled
manufactured into pipe
tested
hot washed
hot dried
painted immediately
on a clean dry surface

There is no adhering scale to chip off, carrying the paint with it. Naturally, there can be no air or water hiding beneath scale to invite corrosion or electrolysis.

That is why it stays good black pipe.

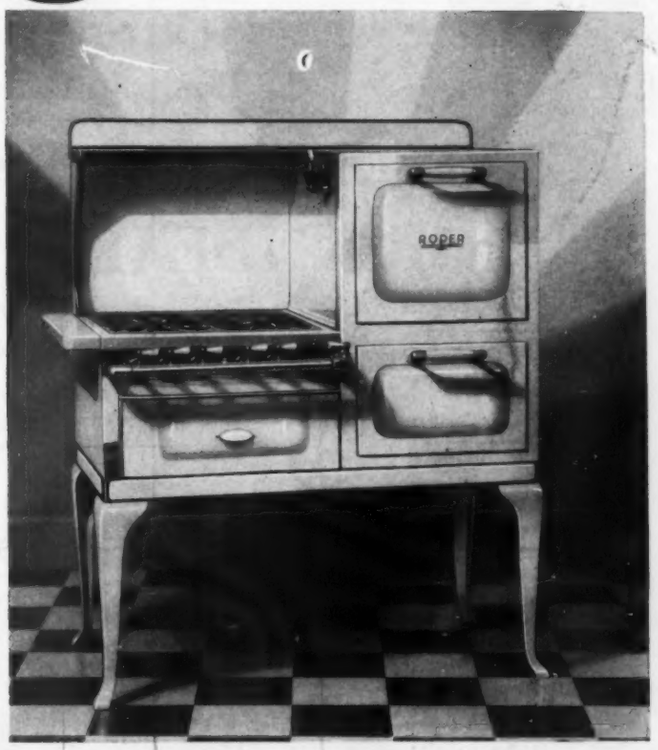
A. O. SMITH CORPORATION

Oil & Gas Field Products Division
General Offices: Milwaukee, Wisconsin

District Offices at New York, Pittsburgh, Tulsa, Houston, Los Angeles

SMITH *WELDED* GAS LINE PIPE

Going over BIG!



Roper
800 Series

Turn Roper's Radio Broadcast into cash

Roper's nation-wide radio broadcast is being conducted by the famous Forecast School of Cookery, New York City—over the Blue Network, three times a week. 51,000,000 people live in the territory covered. The joy and health value of home cooking is being told. The use of gas and the Roper Gas Range is being emphasized. Cash in—by playing up this cooking school program in your newspaper advertising.

We knew that the 800 Series of Roper Gas Ranges would "Hit the spot" with the buying public. The features and refinements built into these ranges could not fail to open up new wide avenues and profits for the merchants carrying the series. Write or wire and let us tell you what these features and refinements are — get the facts about the Roper line and Roper's successful merchandising plans. Now!

GEO. D. ROPER CORPORATION
ROCKFORD, ILLINOIS

Pacific Coast Branch
135 Bluxome St.,
San Francisco, California

ROPER

GAS RANGES

RADIANT HEATERS GAS-FIRED FURNACES

BE SURE THE ROPER PURPLE LINE AND THE ROPER COMPLETE OVEN CONTROL ARE ON THE GAS RANGE YOU SELL.

IDEAL GAS HEATING!

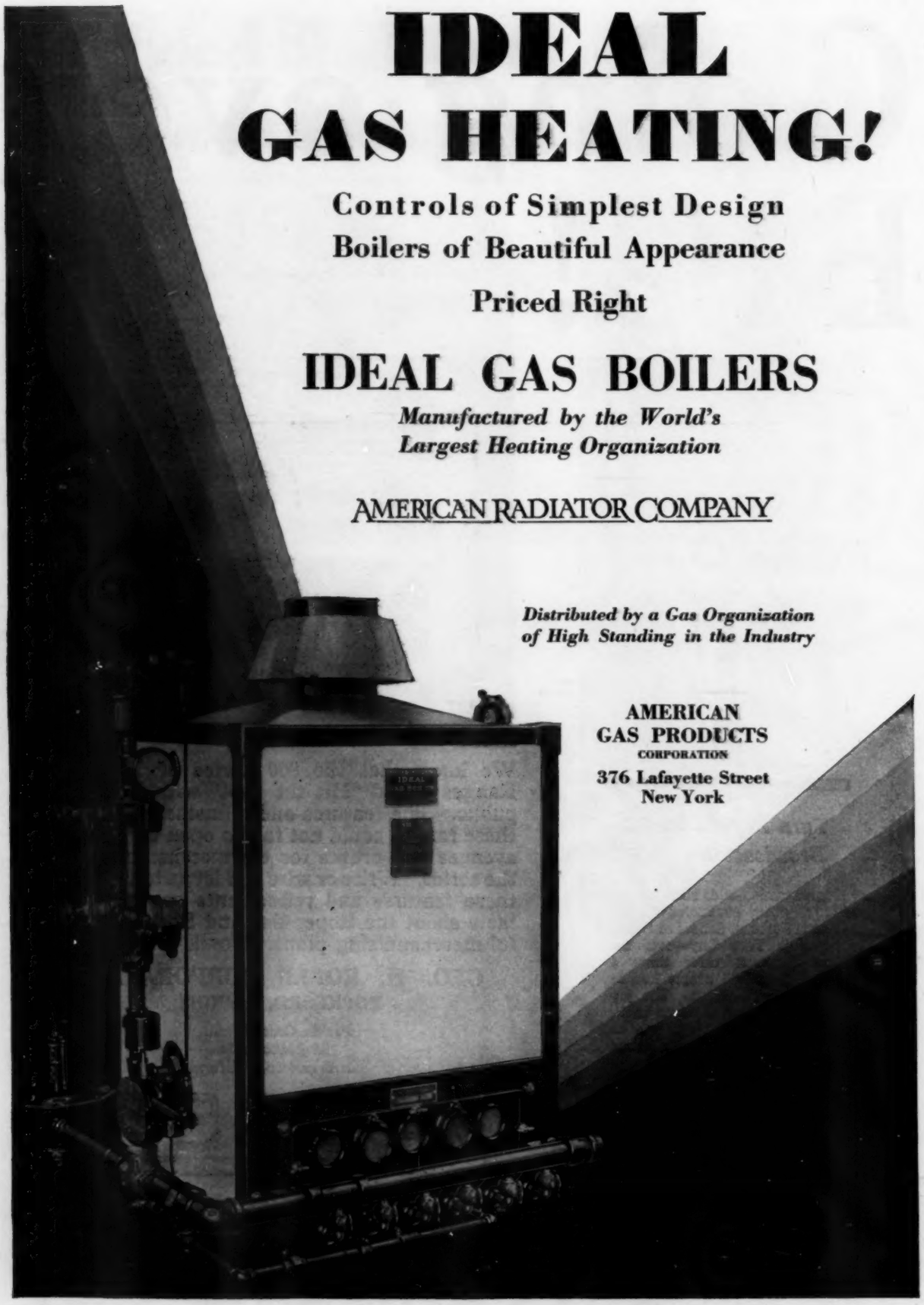
Controls of Simplest Design
Boilers of Beautiful Appearance
Priced Right

IDEAL GAS BOILERS

Manufactured by the World's Largest Heating Organization

AMERICAN RADIATOR COMPANY

Distributed by a Gas Organization of High Standing in the Industry



AMERICAN GAS PRODUCTS CORPORATION
376 Lafayette Street
New York

H. O. 220

How Much *for* *Safety?*

SAFETY cannot be measured in dollars and cents. Yet for a very few dollars extra in first cost—dollars that are quickly saved by the extra efficiency — your customers can have the assurance of safety that only comes from the patented Humphrey Safety Pilot Automatic Shut Off, that automatically shuts off the gas should the pilot light be extinguished.

Just one of the exclusive Humphrey features that, combined with unfailing service, durability and high efficiency, makes the Humphrey Automatic Gas Water Heater the outstanding value of the market.

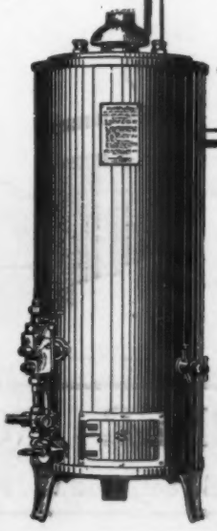
Let the Humphrey Merchandise Man explain Humphrey co-operation to you. New merchandising and advertising plans are yours for the asking.

SERVICE
EFFICIENCY
DURABILITY
SAFETY

Think it over

Can you afford to sell your customers a water heater that is not fully protected against possible serious accident due to over heating or escaping gas? Is not safety far more important to your customers than the few dollars extra it costs in a Humphrey?

... think it over!



HUMPHREY
AUTOMATIC GAS WATER HEATER
A TYPE AND SIZE FOR EVERY PURPOSE AND EVERY PURSE

HUMPHREY COMPANY
DIV. RUUD MFG. CO.
KALAMAZOO, MICHIGAN

THE NEW DEPARTMENT . . .

You should have it. The gas company which has failed to open up a househeating department has overlooked the best way of establishing friendly relation with the public. Selling clean, automatic, uniform heat makes warm friends. People who are enjoying the benefits of gas for house heating are not "kickers."

Of course you can make trouble for your self if you sell the wrong kind of a conversion burner. For instance you might sell pieces of bent pipe with holes drilled in for burners. You might sell a burner which depended on combustion heat in direct contact with the fire pot and which required too large a quantity of gas. Selling makeshift burners will not make you friends.

There are plenty of gas burners on the market—but—there is only one Roberts Controlled Gas Heating Unit. It's more than a burner, it's a complete heating unit. There is positive automatic control of the injection of primary cold air. There is perfect combustion because of the air and gas mixer. The Roberts Venturi tubes are Roberts products. The Roberts radiation plan prevents heat from wasting its way up the chimney. These are only a few of the patented exclusive features of the Roberts Units.

Without the Roberts features no gas burner can give the same high efficiency and it's the efficiency which makes friends for you.

Put the Roberts Controlled Gas Heating Units in your house heating department. This is a good time to start your house heating campaign. Write us for special sales proposition.

Roberts Controlled Gas Heating-Unit for Steam, Hot Water and Warm Air.

MOST HEAT PER DOLLAR!

TRADE MARK

ROBERTS GAS BURNER CORPORATION

128 West Chippewa Street, Buffalo, N. Y.

PURPOSE AND RESULT
OF OUR CONSOLIDATION

Our purpose is to have within one company ample facilities and resources for the development and manufacture of the finest line of automatic controls obtainable.

The merging of the four companies has permitted the employment of engineering and manufacturing resources for the perfection of our products on a basis that would have been impracticable for any one of the companies to undertake separately.

We are confident that the results of our combined efforts will be such that the products and service we have to offer will be of real interest to you as a user of automatic controls.

TIME-O-STAT CONTROLS COMPANY
ELKHART, INDIANA

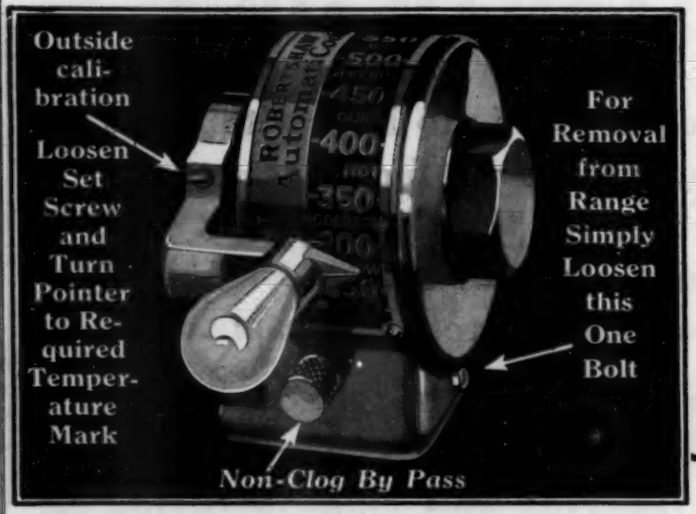
Successor to

Absolute Con-Tac-Tor Corporation
Time-O-Stat Corporation
Leachwood Company
Cramblet Engineering Corporation

Manufacturers of* AUTOMATIC CONTROLS *for

Oil Burners · Gas Burners · Coal Burners · Electric Refrigerators · Mechanical Stokers · Furnace Fans
Industrial Ovens · Ice Machines · Unit Heaters · Water Heaters · *Also* Sign Flashers · Mercury Switches
Electric Heaters · Corrugated Metal Bellows

GAS COMPANIES and STOVE DEALERS


Outside calibration
Loosen Set Screw and Turn Pointer to Required Temperature Mark
For Removal from Range Simply Loosen this One Bolt
Non-Clog By Pass

Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

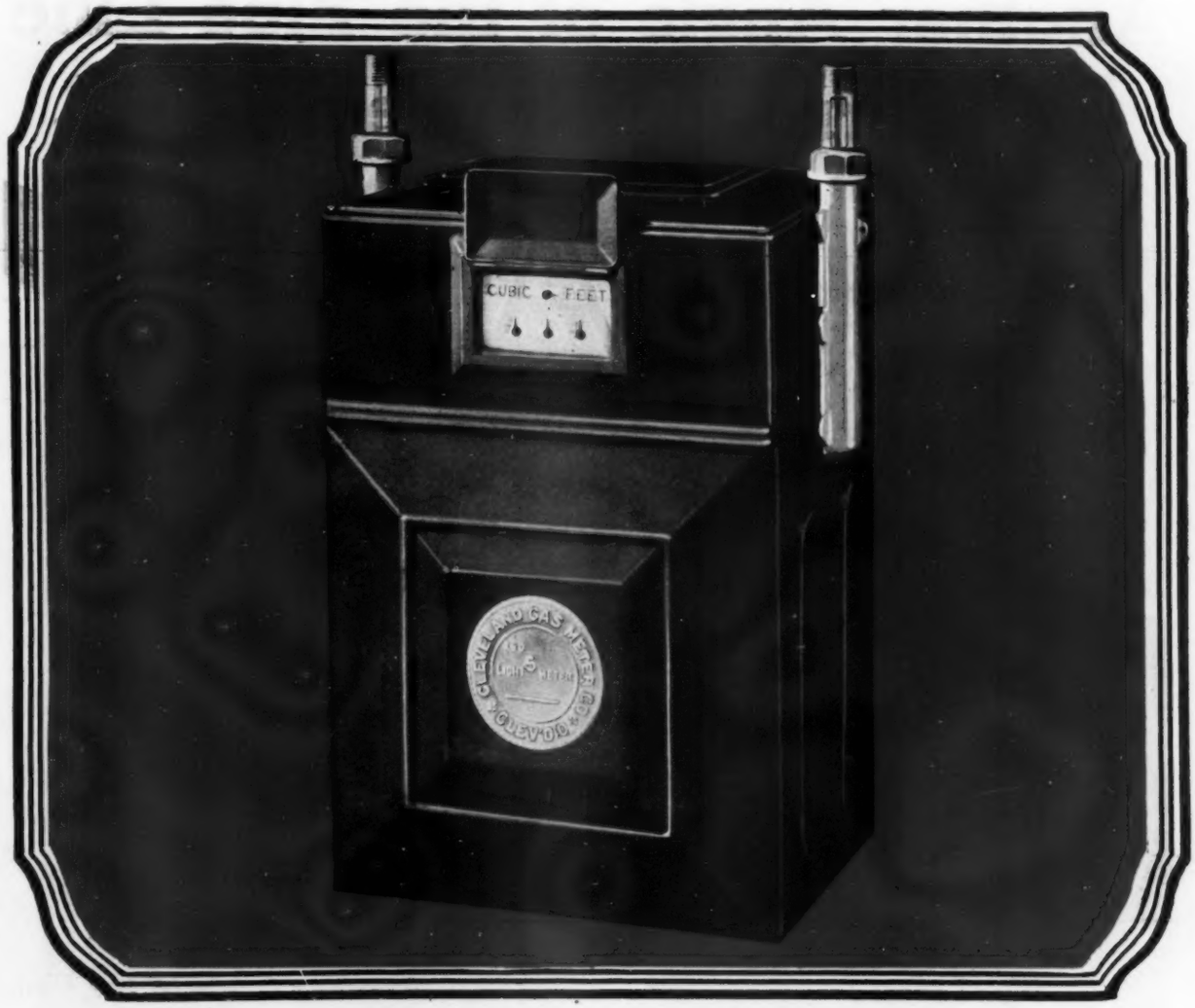
Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges



Cleveland Gas Meters have a reputation for dependable service, the result of over thirty years' experience in manufacturing.

Our thoroughly organized and completely equipped factory assure you that the workmanship, materials, accuracy and general efficiency are unequaled.

"A" Type Meters "B" Type Meters

THE CLEVELAND GAS METER COMPANY

2168-2180 East 65th Street Cleveland, Ohio

Another Angle of the Pipe Line Corrosion Problem---

Pipe Lines

"Pipe line corrosion, that resulting from the action of the sulphur oils inside the lines is more rapid when the lines are only partly filled. This space above the oil where gas and oxygen can accumulate seems to set up accelerated corrosion and the best remedy found has been to reduce the size of the pipe so that the lines will be full and under pressure at all times, for this condition seems to keep the pipes cleaned of products of corrosion formed elsewhere and introduced into the lines with oil, and also prevent new combinations being formed in the lines themselves."

Reprinted by permission from an article by L. G. E. Bignell, A. I. M. E., in Oil Weekly, issue of January 25, 1929.

Another Angle of the Pipe Line Corrosion Problem---

Mr. Bignell has shown how high pressures may reduce interior corrosion. Then too, high pressures mean another economy—quicker deliveries with fewer pumping stations.

Obviously high pressure calls for flawless steel line pipe—pipe that is strong enough to operate safely, economically and without constant expenses for repairs. Pittsburgh Seamless steel line pipe—fully one-third stronger than lap-welded pipe—is strikingly indicated.

Pittsburgh Seamless *Is Safe*

Pittsburgh Steel Products Co.
DIVISION OF
Pittsburgh Steel Co.

PITTSBURGH NEW YORK DETROIT CHICAGO HOUSTON TULSA

A Detailed Record . . .

Approximately 39 Bristol's Recording Gauges similar to that shown above give daily pressure survey. Workman is shown changing chart on instrument installed in outlying section.

of gas pressures maintained at outlying districts over a period of 24-hours or 7-days . . . .

At Minneapolis Gas Co., Minneapolis, Minn., Bristol's Recording Gauges are installed at strategic points about the distribution system. Each morning charts are collected, as shown in illustration at left; providing a detailed check on pressure conditions in all sections of the city during previous 24-hours.

Bristol's Recording Pressure Gauge Model 40. Case is dust- and moisture-proof. Standard finish black enamel. Uses 12 and 8-inch charts.

Such information enables the Gas Co., to determine if adequate pressures were maintained to assure good service—to locate wrong conditions immediately and correct them before serious trouble arises — to quickly and accurately plot peak loads—to determine main capacity in relation to demand, and to serve as a basis for analysis when planning improvements.

These Bristol's Instruments have been in constant operation for a number of years, and, as evidenced by the comment of plant engineer, not only have maintenance costs been remarkably low, but trouble-free operation has stamped Bristol's Gauges as being particularly suitable for this type of service.

Write for Catalogs, Bulletins, Prices. Sales Engineering service without obligation.

The Bristol Company, Waterbury, Connecticut

BRANCH OFFICES:

Pittsburgh, St. Louis, Chicago, Boston, Akron, Detroit, Denver, San Francisco, Philadelphia, Birmingham

COX'S COMPUTER

For High-Pressure Fluid Discharge

Will save hours of tedious, brain-tiring computation and get results instantly when seeking to find the discharge from a pipe. Also to find suitable initial and Terminal Pressures.

Based on a well-known and reliable formula, which is applicable to Gas, Air and other elastic fluids, flowing through pipes with high initial pressures.

Price $5.00 *each, net, in cloth case* 6½ *x* 8 *inches*

COX'S GAS-FLOW COMPUTER

For Low Pressures

This computer solves Prof. Pole's formula for the flow of gas in pipes. All the work is done for the Engineer in making computations relative to the subject covered by the title.

Price $5.00 *each, net, in cloth case* 6½ *x* 8 *inches*

AMERICAN GAS JOURNAL

53 Park Place - - - - - - - - New York City

Checking Temperatures in Waste Heat
Steam Generator at Boston Consolidated Gas Co.

HEAT carried in waste gases generated in the production of water gas is utilized to operate the LaMont Steam Generator shown above at the Everett, Mass., plant of the Boston Consolidated Gas Company. As in the operation of the water gas generator itself, close checking of significant temperatures is highly important in getting maximum efficiency in the production of steam from waste heat developed. The Brown Recording Pyrometer shown performs this important function. Write for information on Brown Instrument applications in the modern, scientifically run gas plant.

THE BROWN INSTRUMENT COMPANY
4473 Wayne Avenue, Phila., Pa.
Branches in 20 principal cities.

Brown Instruments

"To measure is to economize"—*PASCAL.*

Cut Maintenance Cost

and avoid frequent shut-downs with

R & E REFRACTORY CEMENTS

R&E

Water Gas

In a 12' Water Gas Set the lining was laid up with R & E 3000 and a wash coating of the same applied to prevent penetration and clinker adherence. After 1500 hours constant severe operation the generator was shut down for inspection. The lining was in excellent condition and the generator was again put in service for another 1500 hours. At the end of 3000 hours, R & E 3000 had established a record for severe duty far beyond any previous experience with other cements. R & E 3000 had saved a big repair charge.

R & E 3000 comes in plastic form ready for immediate use. It can safely be used for construction and patching work where temperatures do not exceed 3000° F. R & E 3000 is shipped in air-tight steel drums, 800 lbs., 500 lbs., and 100 lbs. Full directions on each drum.

Ask for booklet describing characteristics and uses of our special cements—wet or dry.

Gas Benches

Several months ago we patched a gas retort with R & E 3000, filling a hole 18" x 42". Several other cements had been tried on this repair job but all failed. Our patch with R & E 3000 is still there.

Coke Ovens

A large coke oven plant is using R & E 3000 to level the floors of the ovens when they become corrugated. Ask us how we did it. We'll gladly tell any coke oven superintendent.

Refractory & Engineering Corp'n.
50 Church St. New York

Western Representatives
The Gehnrich Corporation
327 So. La Salle St., Chicago

Distributors with Stock at Convenient Points

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD, has 14,000 Manufacturing Establishments of which many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN MERCURIAL BAROMETERS

are in World-Wide use because they, too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

CAST IRON PIPE

THE symbol shown above has been adopted as the trade mark of The Cast Iron Pipe Research Association. Cast iron pipe with age-defying qualities acknowledged for generations, plus the improvements which scientific research has introduced, can hereafter be identified by this symbol. It will appear on cast iron pipe made by the leading pipe founders listed below. Insist on the "Q-Check" mark when you buy cast iron pipe, whether for gas, water, sewer, or industrial service.

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of cast iron pipe. Pipe bearing the "Q-Check" mark may be obtained from the following: American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe & Foundry Co., Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Cast Iron Pipe & Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York City.

The Cast Iron Pipe Research Association, Thomas F. Wolfe,
Research Engineer, Peoples Gas Building, Chicago.

See advertisements in March 9th Saturday Evening Post; March 11th Time and March 23rd Collier's.

COPYRIGHT 1929, BY C. I. P. R. ASSN.

for MIXING Gases

there's the

CF

Differential Regulator

Use No. 1—To maintain a constant pressure ratio (differential) between manufactured and natural gas.

Use No. 2—To maintain a constant rate of flow, or line pressure.

Use No. 3—To check the flow of and prevent the escape of large volumes of gas when breaks occur in line or holder.

In any of these three services, this regulator gives the same efficient results that the gas world expects from all *C-F* products for gas regulation.

A free bulletin explains the special applications and abilities of the *C-F* Differential Regulator for Mixing Gases.

The CHAPLIN-FULTON MFG. CO.

28-40 PENN AVE. PITTSBURGH, PA.

GOODMAN — Used since 1897 — Improved Locking Sleeve — GAS MAIN STOPPER

STREET DEPARTMENT SUPPLIES

DEPENDABLE GAS MAIN BAGS
Type A—Seamless
Type B—Reinforced Seams
Type C—Canvas Covered
GOODMAN CYLINDRICAL STOPPER
Inflatable for high pressures
SOAP TAPE
BRUSHES
PLUGS
JOINT RUNNERS
AIRLINE MASKS

Safety Gas Main Stopper Co.
523 Atlantic Ave., Brooklyn, N. Y.

RITER-CONLEY CO.
STEEL CONSTRUCTION
PITTSBURGH

STEEL PLATEWORK
FOR
THE GAS INDUSTRY

Gas Holders
Pressure Tanks
Steel Pipe
Steel Barges
Oil Tanks
Purifiers

BRANCH OFFICES
New York — Boston — Baltimore
Chicago — Philadelphia — Detroit
Cleveland — Cincinnati — Seattle
San Francisco — Los Angeles

Advanced Design
Finest Materials
Precision Built

AN UNBEATABLE COMBINATION

The design of the Baby Digger is years in advance of the field. It utilizes the most modern methods of transmitting power. Efficiency, simplicity and absence of "lost motion" are its outstanding characteristics. Thorough knowledge of requirements gained from long experience in the field is reflected in its every detail

Extremely compact and very mobile, The Baby Digger is available for use on more jobs in more locations. In fact, gas companies now using it find that The Baby Digger gives them machine-trenching on over 90% of their work.

Only the best materials obtainable are used, the matter of cost being always subordinate to *results*. Fine alloy steels and the complete use of roller and ball bearings are indications of this.

Finally, The Baby Digger is *precision-built* to exact specifications. Its design and construction are unparalleled in the excavating field.

That these methods are justified is borne out by the many companies who are using from two to ten of these machines. An investigation will show that The Baby Digger is the machine for *you*. Why not write today for information.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

20100 St. Clair Ave. **Cleveland, Ohio**

THE BABY DIGGER

Tycos Gas Leak Indicators

Are a quick and efficient means of locating gas leaks. As soon as the gauges show a leak somewhere along the line, it may be traced by driving small holes along the main and using one of these Indicators. The hand will indicate the place of greatest flow and the leak may be then fixed.

Instruments indicate the presence of either heavy or light gas.

***TYCOS* Gas Leak Indicator No. 3405**

Comes completely equipped in sole leather carrying case with strap, weight about 1¾ pounds.

***TYCOS* Gas Leak Indicator (Vertical form)**

Improved type, vertical form. In sole leather carrying case with strap, weight about 1¾-pounds.

Write for additional information and TYCOS Gas Catalog.

Taylor Instrument Companies

Rochester, N. Y., U. S. A.

Canadian Plant
Tycos Building
Toronto

Manufacturing Distributors in Great Britain
Short & Mason, Ltd., London

HYTEMPITE

Reg. U. S. Pat. Off.

The Universal High Temperature Cement for Gas Plants, because it

—insures quick, economical repairs of Retorts, Jamb Joints Furnace Walls, Arches and Baffles.

—can be used with salvaged, crushed old fire brick.

—is not affected by heating and cooling of ovens.

—stands up under severe weather conditions

—makes thin, strong joint between tile or brick that stands up under extreme abrasive action of clinker tools.

—is easily shot into place with Quigley Refractory Gun.

Keep a drum of HYTEMPITE in Retort House or Boiler Room for quick repairs.

Quigley Furnace Specialties Co., Inc.

26 Cortlandt St **New York, N. Y.**

Stock and Service in every Industrial Center.

HYTEMPITE is a Quigley Product.

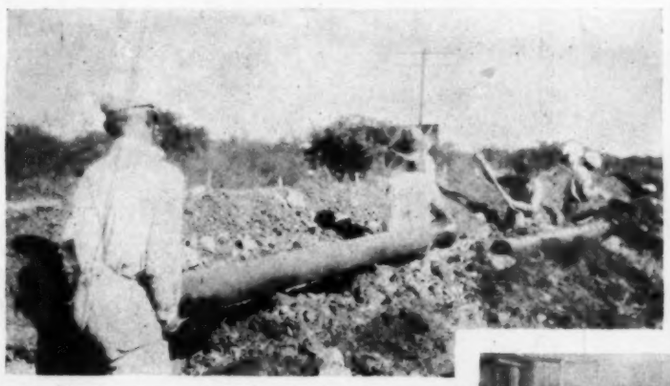
LEADING GAS COMPANIES USE LAMBERT METERS

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.



two pictures *and a* moral

Two pipe laying crews:

ONE—A pick and shovel gang laboriously digging a trench . . . A large pipe gang slowly plugging away making "good" (?) old-fashioned field joints.

THE OTHER— A trenching machine swiftly cutting a ditch . . . A small pipe gang—with one calker—crowding the trenching machine as he keeps on the heels of the men socketing McWane Screw-joint pipe.

The second is a picture of *progress*. It denotes an actual saving of 50% in pipe laying costs.

Are you using genuine McWane pipe and screw joints?

McWane Screw-Joint or cast iron gas pipe

WRITE FOR ILLUSTRATED LITERATURE

McWANE CAST IRON PIPE CO.
BIRMINGHAM, ALA.

PACIFIC STATES CAST IRON PIPE CO.
PROVO, UTAH

SALES OFFICES IN PRINCIPAL CITIES

McWANE
CAST IRON PIPE

Free! a Text Book on Gas making

This valuable manual will be sent to you without charge or obligation.

It tells, in plain language, how coal and water gas are made. Explains how to save in cost of labor and materials. Tells how to locate where trouble exists. Shows plans for laying out a typical gas plant. Tells how to control all the important operations in the plant.

It is a veritable little encyclopedia on the subject of gas making. No matter whether you are the superintendent, engineer or the president of a gas works, you will find this a most interesting and instructive text book.

Write for questionnaire to be filled out for your free copy, or simply mail the coupon. The edition is limited and the regular price is $1.00. So write at once.

CONSOLIDATED ASHCROFT HANCOCK CO. INC.
Subsidiary of Manning, Maxwell and Moore Inc.
100 East 42nd Street, New York City

Consolidated Ashcroft Hancock Co., Inc.,
100 East 42nd St.
New York City

Kindly send me a questionnaire for free copy of your manual No. 7, "Manufactured Gas."

Name .....
Company .....
Address .....
Town ..... State.....

FLANGE END VALVES

We can furnish Valves for working pressures up to 1200 lbs. per sq. in.

Send for Circular 5

The LUDLOW
VALVE MANUFACTURING COMPANY
TROY, N. Y.

New York 81 Fulton St. | Boston Tremont Bldg. | Philadelphia Harrison Building
Chicago The Rookery | Pittsburgh Oliver Bldg. | Kansas City R. A. Long Bldg.

Byllesby Engineering and Management Corporation

BYLLESBY — PIONEERS IN PUBLIC SERVICE — ENGINEERING FINANCE MANAGEMENT

CHICAGO NEW YORK

Pittsburgh San Francisco

Cutting the Mile in Two

With

DOUBLE LENGTH "NATIONAL" PIPE

IN the laying of this 18 mile line of 12-inch double random length "NATIONAL" Pipe there was a considerable saving of time, labor and joint making materials, due to eliminating approximately one-half the number of joints. Another advantage was that the possibility of leakage was greatly reduced and an all around better line obtained.

"NATIONAL" is the only pipe made in double random lengths and, in addition to this feature, it is especially desirable for gas lines because of its high tensile strength, uniform structure and good welding qualities—assuring a strong, sound, dependable line from end to end.

Ask for "NATIONAL" Bulletin No. 26

NATIONAL TUBE COMPANY • Pittsburgh, Pa.

***Subsidiary of* United States Steel Corporation**

History repeats itself

WHEN they first appeared, the vacuum cleaner, the washing machine and a score of other familiar household articles were looked upon as luxuries, pure and simple — extravagant domestic toys for those who could furnish their homes without regard to expense. Then, almost overnight, they were seen everywhere. Their manifest usefulness had made them an indispensable part of the equipment of the modern home.

Today, in the case of the automatic gas water heater, history is repeating itself. Automatic water heaters have passed out of the luxury class. The average housewife has realized that a water heating system can be obtained which gives a plentiful and uninterrupted supply of hot water, without any of the trouble, worry and delay of old-fashioned heating methods, and she will not rest content until she has such a device installed in her own home.

Progressive gas companies throughout the country have found that the group of Automatic Water Heaters built by The Cleveland Heater Co. furnish the most satisfactory answer to this wide-spread demand. The Cleveland Heater Co. has an automatic water heater for every price class, and in each class its product holds an acknowledged leadership. The finest engineering skill, the most conscientious workmanship and the experience of more than twenty years, guarantee their dependability — no better assurance of quality could be asked.

There is much to interest you in the booklet, "Rex Partnership Plan for Gas Companies." Write for it.

The Cleveland Heater Co.

1900 West 112th St. Cleveland, Ohio

CLARK INDUSTRIAL BURNER TIPS

(Patented)

These tips, which lend themselves to various burner applications, are manufactured in fifteen, thirty, and forty-five cubic feet capacities, to fit ¾", 1", and ¼" standard reducing couplings. When employed in low pressure fan blast systems they outlast, many times, the life of metal tips.

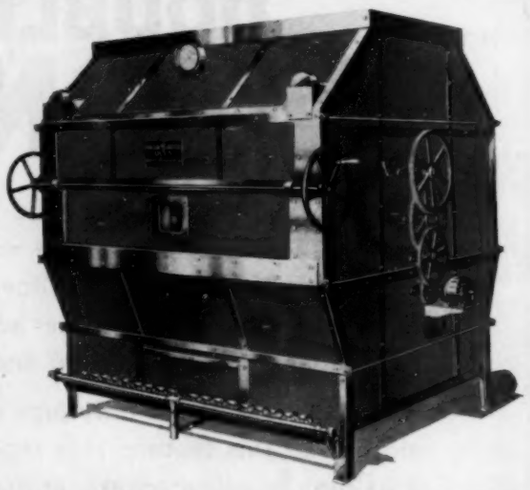
We Invite Correspondence

American Lava Corporation

29-59 William St. Chattanooga, Tenn.

Manufacturers of Lava Tips & Heat Resistant Insulators.

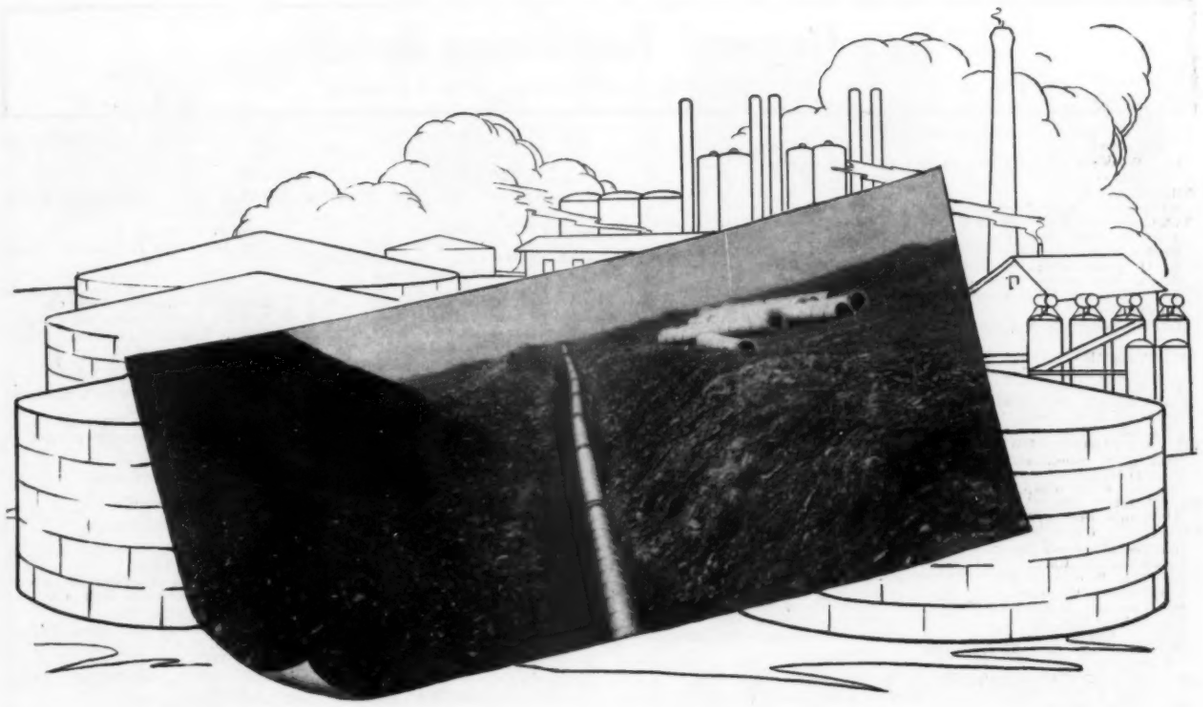
The All-Purpose Gas Oven



For all baking operations, THE MEEK REEL OVEN, embodying the perfected principle of "motion in baking" is without a peer. Write us, telling us your problem. Our experience with thousands of oven users will be at your disposal. Ask for catalog.

The Bruce McDonald Co.,

2015 Washington St.,
KANSAS CITY, MO.



Protect Your Underground Investment

Naylor Pipe of Toncan Iron Will Reduce Replacements

CORROSION takes a yearly toll of millions of dollars in line pipe.

Of the pipe materials available to combat it, Toncan Iron shows, in most cases, a superior corrosion-resistance. Naylor Pipe is made of Toncan Iron.

This, alone, will save you money. But in addition Naylor Pipe has a structural advantage which results in a substantial weight saving. As a result Naylor Pipe costs less to erect.

Together these advantages make Naylor Pipe ideal for most pipe line service. Many large oil companies are already using it. Send for a sample.

NAYLOR PIPE COMPANY
Main Office and Plant, 1230 East 92nd Street, Chicago

Sales Offices:

New York	Cleveland	Philadelphia	Detroit
25 Church St.	1367 East 6th St.	Witherspoon Bldg.	1500 Cadillac Sq. Bldg

Tulsa—507 Philtower Building

DUCOMMUN CORPORATION
Los Angeles San Francisco

Exclusive Distributors: California, Arizona, Nevada and Utah

Montreal, Canada—Mechanical Equipment Company, New Birks Building

TONCAN
Naylor Pipe
Mo-lyb-den-um
IRON

Standardized Naylor Pipe is made in sizes 6" to 12" in standard 20 ft. lengths or special lengths up to 40 ft. Made with five types of pipe ends to wrought pipe standards for five types of joints.

Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion-resistance, making it the favored pipe material

Buyers' Reference Index

See page 129 for advertisements of these products

A B. C. SELF CLINKERING GRATES
The Western Gas Construction Company.

ABSORBERS
Aluminum Co. of America

ACCUMULATORS—STEAM
The Gas Machinery Co.
Ruth's Steam Accumulator Co.
A. O. Smith Corp.
Smoot Engineering Corp.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

ACETYLENE
The Prest-O-Lite Co., Inc.
Oxweld Acetylene Co.

ACETYLENE EQUIPMENT
American Lava Corp.
Alexander Milburn Co.

ACCOUNTING MACHINES
Remington Rand, Inc.

AIR FILTERS
Staynew Filter Corp.

ALUMINUM PAINT
Aluminum Co. of Amer.

AMMONIA CONCENTRATORS
Bartlett Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA CONCENTRATED LIQUOR PLANTS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

AMMONIA PIPE
National Tube Company.

AMMONIA RECOVERY APPARATUS
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

AMMONIA STILLS
Bartlett-Hayward Co.
Cruse-Kemper Co
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
John S. Unger.
The Western Gas Construction Company.

AMMONIA TEST
American Meter Co.

APPRAISALS & INVENTORIES
Stacey Bros. Gas Construction Co.
United Engineers & Constructors, Inc.

APPARATUS
Laboratory Experimental
American Meter Co.
Service
American Meter Co.

ASH STORAGE BINS
C. W. Hunt Co., Inc.
Semet-Solvay Engineering Corp.
Riter-Conley Co.
The Stacey Mfg. Co.

AUDITS
United Engineers & Constructors, Inc.

AUTOMATIC CONTROLS FOR WATER GAS APP.
United Engineers & Constructors, Inc.

AUTOMATIC RAILWAYS
C. W. Hunt Co., Inc.

BACK PRESSURE VALVES
Connelly Iron Sponge & Governor Co.

BACKRUN GAS EQUIPMENT
Semet-Solvay Engineering Corp.

BAGS
Safety Gas Main Stopper Co.

BAROMETERS
Connelly Iron Sponge & Governor Co.
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

BELTS
Conveyor and Elevator.
Robins Conveying Belt Co.

BENCHES
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Gas Machinery Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BENZOL
Bartlett-Hayward Co.
Carl Still, Inc.
The Koppers Construction Co.

BENZOL RECOVERY PLANTS
Semet-Solvay Engineering Corp.

BLOWERS
Connersville Blower Co., The.
Gas Engineering Co.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BLUE GAS PLANT
Bartlett-Hayward Co.
Induqas, Inc.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

BOILERS—WASTE HEAT
Bartlett-Hayward Co.
Combustion Engineering Corpn.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

BOOKKEEPING MACHINES
Remington Rand, Inc.

BOOSTERS
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The

BRICK
Fire and Checker
Botfield Refractories Co.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment Co.-Russell Eng. Corp.
United Engineers & Constructors, Inc.
United States Refractories Corp.
Silica
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Company.
United States Refractories Corp.

BRUSHES, PIPE CLEANING
Safety Gas Main Stopper Co.

B. T. U. INDICATORS
Alpha-Lux Co.

BUILDINGS
United Engineers & Constructors, Inc.

BURNERS (Industrial)
American Lava Corp.
The C. M. Kemp Mfg. Co.
Conversion
Cleveland Gas Burner & Appliance Co.
Conversion House Heating
Roberts Gas Burner Corp.
Fuel
Cleveland Gas Burner & Appliance Co.

BY-PRODUCT COKE
Semet-Solvay Co.

BY-PRODUCT PLANTS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
International Coal Carbonization Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
West Gas Improvement Co.

CABLE RAILWAYS
C. W. Hunt Co., Inc.
Alpha-Lux Company.
American Meter Co.
Consolidated Ashcroft Hancock Inc., Co.

CALORIMETERS
John J. Griffin & Company.

CALORIMETER ACCESSORIES
American Meter Co.

CARBIDE
Union Carbide Sales Co.

CARBONIZATION
The Gas Machinery Co.
Low Temperature
International Coal Carbonization Co.

CARBURETTED WATER GAS
The Western Gas Construction Co.

CARBURETTED WATER GAS PLANTS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

CARS
C. W. Hunt Co., Inc.

CASINGS, SEAMLESS STEEL
National Tube Co.

CAST IRON PIPE
Bell
Cast Iron Pipe Research Ass'n.
Spigot
Cast Iron Pipe Research Ass'n.

CEMENTS
Quigley Furnace Spec. Co., Inc.
Acid-proof
Botfield Refractories Company.
Quigley Furnace Spec. Co., Inc.
Firebrick
Botfield Refractories Company.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United States Refractories Corp.
High Temperature
Alpha-Lux Company.
Botfield Refractories Company.
E. J. Lavino & Co.
Quigley Furnace Spec. Co., Inc.
United States Refractories Corp.
Refractory
Botfield Refractories Company.
Improved Equipment-Russell Engineering Corp.
E. J. Lavino & Co.
Refractory Engineering Corp.
United States Refractories Corp.

CHAMBER OVENS
United Engineers & Constructors, Inc.

CHARGING MACHINERY
Bartlett-Hayward Co.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

CHUTES
Eaton-Kent, Inc.
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

CLAMPS (PIPE)
S. R. Dresser Mfg. Co.

CLOCKS & WATCHES, Stop
American Meter Co.

COALS
Boone County Coal Corpn.
Pittsburgh Coal Co.
Westmoreland Coal Co.

COAL GAS APPARATUS
Bartlett-Hayward Co.
Carl Still, Inc.
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Company
The Western Gas Construction Company.

COAL & COKE BINS CASTINGS
The Koppers Construction Co.
The Stacey Mfg. Co.

COAL AND COKE HANDLING MACHINERY
Bartlett-Hayward Co.
Dry Quenching Equipment Corp.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Robins Conveying Belt Co.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.

COAL TAR PRODUCTS
International Combustion, Tar, and **Chemical Corpn.**
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COAL TUBES
C. W. Hunt Co., Inc.
Meter
American Meter Co.
Superior Meter Co.
Service
American Meter Co.

COKE CRUSHERS
The Koppers Construction Co.
Robins Conveying Belt Co.

COKE QUENCHING
Dry Quenching Equipment Corp.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.

COKE RECLAMATION SYSTEMS
C. W. Hunt Co., Inc.

COMPUTERS
Heating Value
United Engineers & Constructors, Inc.

CONDENSERS
Aluminum Co. of America.
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
High Duty
Stacey Bros. Gas Const. Co.
United Engineers & Constructors, Inc.

CONTRACTORS' TUBS
C. W. Hunt Co., Inc.

CONTROLS
The Bristol Company.
The Brown Instrument Co.
Robertshaw Thermostat Co.
Time-O-Stat Controls Co.
Combustion
Smoot Engineering Corp.
Gas Pressure
Smoot Engineering Corp.
Gas Producer
Smoot Engineering Corp.
Hot Water Heat System
The Cleveland Heater Company.
Water Gas Machine
Smoot Engineering Corp.

CONVEYORS
C. W. Hunt Co., Inc.
Isbell-Porter Company.
The Koppers Construction Co.
Robins Conveying Belt Co.

CONCENTRATORS, AMMONIA
(See Ammonia Concentrators.)

COOLERS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
Air
Andale Company.
Ammonia Liquor
Andale Company.
Gas
Andale Company.
Oil
Andale Company.

COOLING COILS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

A Strong Offense Is the Best Defense

AND that's a good policy whether you apply it to military encounters, boxing bouts or your domestic load problem.

Right now your company is engaged in a championship fight—a battle for a prize that is worth millions of dollars! You have held the title—the family wash—for a good many years, and, until recently, never had a serious challenger. But you know well that you have plenty of keen competition today!

The stage is set. The training is over. And the battle is on! Not only your company, but *the entire gas industry is on the defensive*—striving to retain this domestic laundry load—and we want to help!

The Lamneck Laundry Dryer

is your best defense—and aggressively merchandised it is a strong offense! When your appliance salesmen show the housewife how she can wash, dry and iron, all in one day, on the same day each week—and have her clothes cleaner, whiter, with less wear and tear—*the washing will STAY HOME!*

The Lamneck Laundry Dryer is well known to the gas industry. It is being advertised intensively this year in national publications. Folders, broadsides, window trims and newspaper mats are available to help you in your local sales efforts.

The domestic dryer *assures* the use, at least one day each week, of washer, ironer, water heater, hot plate—and it is an important factor in the increased use of every other appliance, both gas and electric. It *retains* the domestic laundry load which averages, at a conservative estimate, 22,000 cu. ft. annually per domestic meter.

The W. E. Lamneck Company

444 Dublin Ave. Columbus, Ohio.

HUNT

PIVOTED BUCKET CONVEYOR

The peculiar system of driving by pawls, of which the Hunt is the only type existent, relieves the wheel of all stress. The Hunt conveyor can assume twists impossible with a sprocket driven machine.

WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope, and the "Flotograv" (Coke Reclamation System).

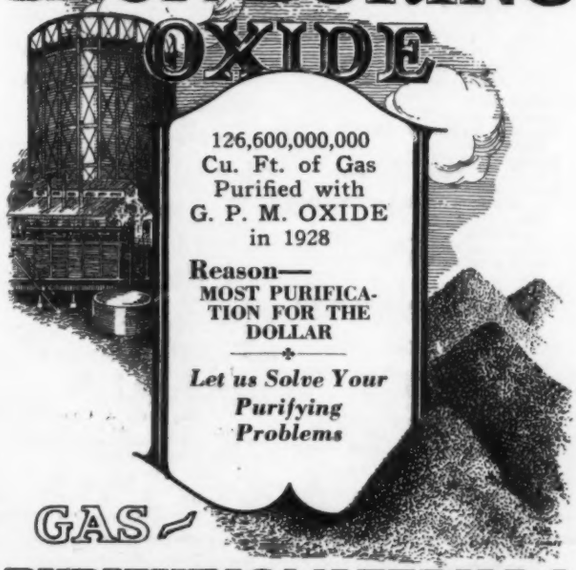
C.W.HUNT CO. Inc.

WEST NEW BRIGHTON, STATEN ISLAND, N. Y.

Chicago - Montreal - Boston

HUNT

IRON BORING OXIDE



GAS PURIFYING MATERIALS COMPANY INC.

FOOT OF HALSEY STREET · · · LONG ISLAND CITY
NEW YORK
BRANCH YARD—PROVIDENCE, R.I.

Buyers' Reference Index

See page 129 for advertisements of these products

COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victaulic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CUTTING APPARATUS & SUPPLIES
Alex and Milburn Co.
Union Carbide & Carbon Co.

CRUSHERS
Riter-Conley Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.

DEMONSTRATION METERS
Lambert Meter Co.

DIAPHRAGMS
Lambert Meter Co.
(Meter)
American Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

DRYERS (Laundry)
W. E. Lamnech Co.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.
Craig Ridgway & Son Co.
Robins Conveying Belt Co.

ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
United Engineers & Constructors, Inc.
George H. Waring.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
Riter-Conley Company.
Stacey Gros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
United Engineers & Constructors, Inc.
Measurement
American Meter Co.

EXHAUSTERS
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company.

EXPANSION BENDS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

FILES (Steel and Wood)
Remington Rand, Inc.

FILES (Visible)
Remington Rand, Inc.

FILTERS, Gas
American Meter Co.

FIREBRICK, CEMENT
General Refractories Co.
Quigley Furnace Specialties Co., Inc.

FIREBRICK CHECKER BRICK
(See Brick)
Botfield Refractories Company.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.

FITTINGS
James B. Clow & Sons.
Isbell-Porter Company.
Kitson Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.

FIXTURES
American Lava Corp.
General Gas Light Co.

FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FLOW METERS
Brown Instrument Co., The
Lambert Meter Co.

FLUES
P. J. Hentschel

FLUE PIPE (Cast Iron Oval)
James B. Clow & Sons.
Semet-Solvay Engineering Corp.

FURNACES
Combustion Engineering Corpn.
James B. Clow & Sons.
Gas Fired
The C. M. Kemp Mfg. Co.
Gas Soldering
American Meter Co.

GAS ANALYSIS APPARATUS
Metric Metal Works.

GASKETS
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc.
Pittsburgh Equitable Meter Co.

GAS COAL
Boone County Coal Corpn.
Pittsburgh Coal Co.
Westmoreland Coal Co.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
Carl Still, Inc.
Gas Engineering Co.
Isbell-Porter Company.
United Engineers & Constructors, Inc.
West Gas Improvement Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
Metric Metal Works.

GATE VALVES (See Valves)

GATES—WIND & BLAST
The P. H. & F. M. Roots Company.

GAUGE BOARDS
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

GAUGES
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Taylor Instrument Companies.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
Consolidated Ashcroft Hancock Co., Inc.
D. McDonald & Co.
Precision Thermometer & Instrument Company.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

GENERATORS, Oxygen & Acetylene
Alexander Milburn Co.

GLOVES
Rubber
Safety Gas Main Stopper Co.

GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Helme & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Helme & McIlhenny.

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.

HEATERS
James B. Clow & Sons.
Feed Water
Andale Company.
House
American Gas Products Corp.
Cleveland Gas Burner & Appliance Co.
The Cleveland Heater Company.
Roberts Gas Burner Corp.
Room
American Gas Products Corp.
American Stove Company.
General Gas Light Co.
Homestead Heater Company.
Welsbach Company.
Water
The Cleveland Heater Company.
Humphrey Company.
Ruud Mfg. Co.
Kompak Company.
Welsbach Company.
Pittsburg Water Heater Co.

HIGH CAPACITY METERS
Lambert Meter Co.

HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.

HOISTS
The Gas Machinery Co.
C. W. Hunt Co., Inc.
Robins Conveying Belt Co.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
Robins Conveying Belt Co.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Smoot Engineering Corp.

INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Gas Purifying Materials Co., Inc.

IRON SPONGE
Connelly Iron Sponge & Governor Co.

INSTRUMENTS
Alpha-Lux Company.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

TIGHT

3 WAY HYDRAULIC "UP AND DOWN" STEAM VALVES

3 WAY HIGH TEMPERATURE GAS TRANSFER VALVES

STRAINERS FOR WATER

STAINERS FOR OIL

OIL HEATERS

AMMONIA LIQUOR COOLERS

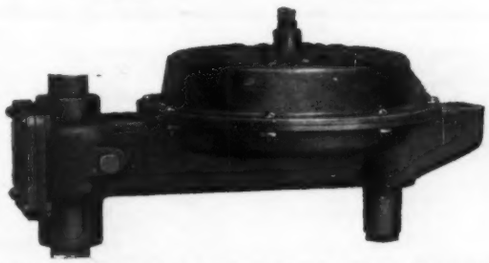
FEED WATER HEATERS
Using the Heat from the Gas As it Leaves the Wash Box

GAS DEHYDRATORS

GAS AFTERCOOLERS

ANDALE COMPANY
1600 ARCH STREET
PHILADELPHIA, PA

GROBLE
REGULATORS & GOVERNORS



FEATURES IN GROBLE'S ARE WORTHY OF YOUR MOST SERIOUS CONSIDERATION.

Accessibility of valve.
Removable orifice.
Simplicity of complete repair while in service.

These items improve pressure regulation and lower maintenance cost.

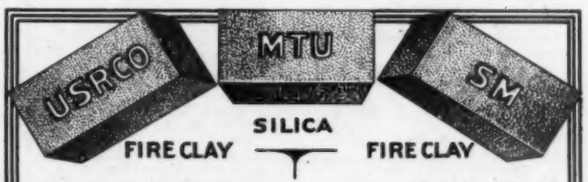
GROBLE GAS REGULATOR COMPANY
Anderson, Indiana

Representatives
Utilities Service Co., Peoples Gas Building, Chicago.
H. E. Broughton, 404 Donovan Building, Detroit.
The Worrall Co., 472 Central Ave., East Orange, N. J.
Midland Supply Co., Dwight Bldg., Kansas City, Mo.
Seidenglanz & Co., Second Unit, Santa Fe Bldg., Dallas.
Fagan-Andrews Co., 135 Michigan St., Milwaukee

HOMESTEAD FIRES

Radiant "Coalfires"
Radiant "Woodfires"

Homestead Heater Company, Inc.
Selvage St. and Fabyan Pl., Newark, N. J.



FOR BY-PRODUCT COKE OVENS
GAS RETORTS and BOILER SETTINGS
FINE GROUND CLAY — SILICA CEMENT

U·S·REFRACTORIES CORPORATION
MOUNT UNION, PA.—OLIVER BLDG. PITTSBURGH.

EASTER

suggests the new—
new garments
new scenes
new ideas
new faces
and this year of grace let it mean—
renewed health
renewed vigor
renewed joy of living
by your coming to

ATLANTIC CITY

and to the business man's favorite hotel

The Chelsea

and then you will know
you really always knew
what was good for you if
only you would take time
to do it!

Buyers' Reference Index

See page 129 for advertisements of these products

Recording
American Meter Co.
JOINTS (Pipe)
S. R. Dresser Mfg. Co.
U. S. Cast Iron Pipe & Foundry Co.
Insulating
United Engineers & Constructors, Inc.
Victaulic Co. of Amer.
JOINT RUNNERS
Safety Gas Main Stopper Co.
LAMPS
General Gas Light Co.
LAMP POSTS
General Gas Light Co.
LAUNDRY EQUIPMENT
W. E. Lamneck Co.
LAVA BURNER GRIDS
American Lava Corp.
LAVA PILOT TIPS
American Lava Corp.
LINING—REFRACTORY
(See Refractory Linings
LOCKERS
Remington Rand Co.
LOOSE LEAF EQUIPMENT
Remington Rand Co.
LUX MATERIAL
Alpha-Lux Company.
LUX SPONGE
Alpha-Lux Company.
MANILA AND WIRE ROPE
C. W. Hunt Co., Inc.
MANOMETERS
Brown Instrument Co., The
Precision Thermometer & Instrument Company.
MANTLES
General Gas Light Co.
Welsbach Company.
MASKS—GAS
Safety Gas Main Stopper Co.
MAST & GAFF OUTFITS
C. W. Hunt Co., Inc.
MEASURING CHUTES
C. W. Hunt Co., Inc.
MECHANICAL GENERATORS for Water Gas App.
United Engineers & Constructors, Inc.
METER CONNECTIONS
American Meter Co.
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
Lambert Meter Co.
D. McDonald & Co.
Maryland Meter Works.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
METER REPAIRING
Lambert Meter Co.
METER TESTER, Hydro-Pneumatic
American Meter Co.
METERS
Brown Instrument Co., The
Pittsburgh Equitable Meter Co.
Air
American Meter Co.
Connersville Blower Co., The
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Artificial
American Meter Co.
Connersville Blower Co., The
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
Neptune Meter Company.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Nathaniel Tufts Meter Works.
Demand
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Lambert Meter Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Superior Meter Co.
Demonstration
American Meter Co.
Dry
American Meter Co.
John J. Griffin & Company.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Exhibition
American Meter Co.
Natural Gas
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
Maryland Meter Works.
D. McDonald & Co.
Metric Meter Works.
The P. H. & F. M. Roots Company.
The Sprague Meter Co.
Superior Meter Co.
Oil
American Meter Co.
Connersville Blower Co., The
The Gas Machinery Co.
Orifice
American Meter Co.
Positive
The Sprague Meter Co.
Prepayment
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Proportional
The P. H. & P. M. Roots Company.
Station
American Meter Co.
Connersville Blower Co., The
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Co.
Metric Metal Works.
The P. H. & F. M. Roots Company.
Nathaniel Tufts Meter Works.
The Western Gas Construction Company.
Steam
American Meter Co.
The Gas Machinery Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
Test
American Meter Co.
John J. Griffin & Company.
Maryland Meter Works.
D. McDonald & Company.
Metric Metal Works.
The Sprague Meter Co.
Superior Meter Co.
Nathaniel Tufts Meter Works.
Wet Test
American Meter Co.
MILLER GRIP PACKING
Connelly Iron Sponge & Governor Co.
MIXERS, GAS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
Semet-Solvay Engineering Corp.
Smoot Engineering Corp.
MOISTURE DETERMINATORS
United Engineers & Constructors, Inc.
MOTOR CARS
C. W. Hunt Co ,,Inc.
NAPHTHALENE EXTRACTORS
Bartlett-Hayward Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.
OFFICE FURNITURE
Remington Rand, Inc.
ORE, CHROME
E. J. Lavino & Co.
OVENS (REEL TYPE BAKE)
The Bruce McDonald Co.
OVEN SHELF; SAFETY
Wm. Parke. Inc.
OVENS—COKE AND GAS
Carl Still, Inc.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
OXIDE
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co., Inc.
E. J. Lavino & Co.
OXYGEN
Linde Air Products Co.
OXYGEN AND HYDROGEN METERS
Lambert Meter Co.
PACKING
Asbestos
Safety Gas Main Stopper Co.
PAINTS
Aluminum Co. of America.
Safety Gas Main Stopper Co.
The Stacey Mfg. Co.
Wailes Dove-Hermiston Corp.
Metal Protective
Aluminum Co. of America.
Semet-Solvay Co.
PAINTS, ANTI ACID AND ALKALI
Aluminum Co. of America.
Quigley Furnace Spec. Co., Inc.
PAINTS, RUSTPROOF
Aluminum Co. of America.
Quigley Furnace Spec. Co., Inc.
PHOTOMETERS
Connelly Iron Sponge & Governor Co.
PIOTS-SAFETY
Time-O-Stat Controls Co.
PIPE
Waylow Pipe Co.
Hedges-Walsh-Weidner Co.
National Tube Co.
The Stacey Mfg. Co.
Bell
American Meter Co.
Semet-Solvay Engineering Corp.
McWane Cast Iron Pipe Co.
Bell and Spigot
U. S. Cast Iron Pipe & Foundry Co.
Cast Iron
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
Flange
James B. Clow & Sons.
Semet-Solvay Engineering Corp.
U. S. Cast Iron Pipe & Foundry Co.
Screw Joint Cast Iron Pipe
McWane Cast Iron Pipe Co.
Seamless Steel
Pittsburgh Steel Products Co.
Spigot
James B. Clow & Sons.
McWane Cast Iron Pipe Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Naylor Spiral Pipe Co.
Steel
Bartlett-Hayward Co.
James B. Clow & Sons.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Pittsburgh Steel Products Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
Spiral Pipe
Naylor Spiral
Welded Steel
Bartlett-Hayward Co.
Cruse-Kemper Co.
The Gas Machinery Co.
National Tube Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
PIPE COATINGS
Wailes Dove-Hermiston Corp.
PLANTS—GAS, COMPLETE
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
The Koppers Construction Co.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
PLATES
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Floor
Gas Engineering Co.
The Gas Machinery Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
PLUGS, SERVICE AND MAIN
Rubber
Safety Gas Main Stopper Co.
Soft Wood
Safety Gas Main Stopper Co.
PORTABLE TEST METERS
Lambert Meter Co.
PRODUCER GAS PLANT
Gas Engineering Co.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PRODUCER GAS STEAM
American Meter Co.
PROVERS—Critical Flow for H. P Field Testing
American Meter Co.
PROVERS—METER
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co.
Superior Meter Co.
PUMPS
Drip
American Meter Co.
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
Gas
The P. H. & F. M. Roots Company.
Gas Bag
Safety Gas Main Stopper Co.
Hand
Lambert Meter Co.
Oil
Connersville Blower Co., The
The Gas Machinery Co.
D. McDonald & Co.
The P. H. & F. M. Roots Company.
Power
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Pressure
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Service
American Meter Co.
Lambert Meter Co.
Superior Meter Co.
Service Cleaner
American Meter Co.
John J. Griffin & Company.
Lambert Meter Co.
Safety Gas Main Stopper Co.
Superior Meter Co.
Tar
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Water
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Vacuum
American Meter Co.
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
PURIFIERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Company.
The Koppers Construction Co
Semet-Solvay Engineering Corp.
Stacey Bros. Gas. Const. Co.
The Stacey Mfg. Co.
Riter-Conley Company.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

WESTMORELAND "CRITERION" GAS COAL

The Standard for Gas Making Since 1854

Since this Company commenced operations, its well-known Westmoreland "Criterion" Gas Coal has been largely used by the Gas Companies of Northeastern United States and Canada, and its character is established as having no superior in gas giving qualities and freedom from sulphur and other impurities.

Mines situated on the Pennsylvania Railroad.
in Westmoreland County, Pa.

THE WESTMORELAND COAL COMPANY
Principal Office, Lewis Building, 15th and Locust Sts., Philadelphia, Pa.
Shipping Ports: Philadelphia, Baltimore, South Amboy, N. J., Lake Ports.

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

LAVINO OXIDE

Intensely Active. High Total Sulphur Absorption at Minimum Cost.

"THE EFFICIENT PURIFIER"

The Sponge with the large Tough Shavings Always Uniform

LAVINO SPONGE

E. J. LAVINO and COMPANY - BULLITT BLDG. - PHILADELPHIA, PA.
NEW YORK CHICAGO PITTSBURGH

GAS ENGINEERING CO.

Manufacturers of Gas Production Equipment

TRENTON, N. J.

JOHN S. UNGER

GAS ENGINEER
Specialist in Ammonia Recovery
and Manufacture of Ammonia Products,
Builder of Unger Ammonia Stills
640 GRACE ST., CHICAGO

Improved Equipment-Russell Engineering

HORIZONTAL GAS OVENS.
COAL GAS PLANTS.
BENCHES-STOP-ENDS & THROUGHS.

NEW YORK · Corporation · CHICAGO

REFILLINGS, ADDITIONS, REPAIRS.
IMPROVEMENTS, EXTENSIONS, APPARATUS

Buyers' Reference Index

See page 129 for advertisements of these products

PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.

PURIFIER TRAYS
Bartlett-Hayward Co.
Connelly Iron Sponge & Governor Co.
Cruse-Kemper Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PYROMETERS
Maryland Meter Works
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
Recording
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.

RADIATORS
Gas Steam
American Gas Products Corp.
James B. Clow & Sons.
Gas Water
James B. Clow & Sons.

RANGES—GAS
American Stove Co.
Eriez Stove Mfg. Co.

RECORDING DEMAND METERS
Lambert Meter Co.
Maryland Meter Works

REFRACTORY CEMENTS
Botfield Refractories Company
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.
Refractory & Engineering Corp.
United States Refractories Corp.

REFRACTORY GUN
Botfield Refractories Company
Quigley Furnace Spec. Co. Inc.

REFRACTORY LININGS
Alpha-Lux Company
Botfield Refractories Company
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
Quigley Furnace Spec. Co. Inc.
United Engineers & Constructors Inc.
The Western Gas Construction Company
United States Refractories Corp.

REGULATORS
American Meter Co.
The Chaplin Fulton Mfg. Co.
Connersville Co., The
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
Air Pressure
Time-O-Stat Controls Co.
Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Oxygen & Acetylene
Alexander Milburn Co.
Steam Pressure
Smoot Engineering Corp.

REPAIR PARTS
Lambert Meter Co.

RESPERATING OUTFITS
Connelly Iron Sponge & Governor Co.

RETORTS
Horizontal and Inclined
Improved Equipment—Russell Engineering Corp.
Vertical
United Engineers & Constructors Inc.
West Gas Improvement Co.
Silica and Clay
Improved Equipment—Russell Engineering Corp.
The Gas Machinery Company
United States Refractories Corp.

RETORT CEMENT
Alpha-Lux Company
Botfield Refractories Company
The Gas Machinery Co.
Improved Equipment—Russell Engineer Corp.
Quigley Furnace Spec. Co. Inc.
Refractory & Engineering Corp.
United States Refractories Corp.

REVERSE FLOW GOVERNORS
Connelly Iron Sponge & Governor Co.

REYNOLDS
District
Reynolds Gas Regulator Co.

RUBBER AND JUTE JOINTING MATERIALS
Southwestern Pipe Joint & Eng. Co. Inc.

SAFES
Remington Rand Inc.

SAFETY VALVES
Connelly Iron Sponge & Governor Co.

SCREENS
Robins Conveying Belt Co.

SCREENS, ELECTRIC VIBRATING
C. W. Hunt Co. Inc.

SCRUBBERS
Bartlett Hayward Co.
Cruse-Kemper Company
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
West Gas Improvement Co.
The Western Gas Construction Company

SERVICE BOXES
James B. Clow & Sons.
The Stacey Mfg. Co.

SERVICE CLEANERS
American Meter Co.

SERVICE PLUG-RUBBER
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

SHELVING (Steel)
Remington Rand Inc.

SKIP HOIST
C. W. Hunt Co. Inc.

SPECIFIC GRAVITY APPARATUS
American Meter Co.

SPECIFIC GRAVITY GAUGES
Alpha-Lux Company.

SPONGE
Alpha-Lux Company
Connelly Iron Sponge & Governor Co.
Gas Purifying Materials Co. Inc.

SPRAYS, for Water Gas Machines
Semet-Solvay Engineering Corp.

SPRAYERS, PAINT
Alexander Milburn Co.

STACEY BULLETT for High Pressure Storage
Stacey Bros. Gas Construction Co

STATION METERS (See Meters Station)

STEAM ACCUMULATORS (See Accumulators—Steam)
The Gas Machinery Co.
Smoot Engineering Corp.
United Engineers & Constructors Inc.
The Western Gas Construction Company

STOPPERS
Safety Gas Main Stopper Co.

STRAINERS—GAS, STEAM, WATER
Andale Company

STREET DEPT. EQUIPMENT
American Meter Co.
Connelly Iron Sponge & Governor Co.
Safety Gas Main Stopper Co.

STREET LAMPS
General Gas Light Co.
Welsbach Street Lighting Co.

SULPHUR AND AMMONIA TEST (Apparatus)
American Meter Co.

SYSTEMS
Combustion Control
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
Hot Water Heat Control
The Cleveland Heater Company
Time-O-Stat Controls Co.

TABULATING MACHINES
Remington Rand, Inc.

TACHOMETERS
Brown Instrument Co., The
The Bristol Company.
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.

TANK REGULATORS
Reynolds Gas Regulator Co.

TANKS
Bartlett-Hayward Co.
Cruse-Kemper Company.
Gas Engineering Co.
Semet-Solvay Engineering Corp.
A. O. Smith Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Gas, Oil, Storage
Stacey Bros. Gas Const. Co.
High Pressure
The Gas Machinery Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.

TAPE SOAP—BINDING
Safety Gas Main Stopper Co.

TAR DISTILLING PLANTS
Carl Still, Inc.
Gas Engineering Co.
The Gas Machinery Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.

TAR DISPLACEMENT SYSTEM
The Gas Machinery Co.

TAR EXTRACTORS
Bartlett-Hayward Co.
Gas Engineering Co.
The Gas Machinery Co.
Isbell-Porter Co.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.
United Engineers & Constructors, Inc.

TEMPERATURE CONTROLING DEVICE—Oven
American Stove Co.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Robertshaw Thermostat Co.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

TESTING APPARATUS, GAS
American Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.

THERMOMETERS
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Lambert Meter Co.
D. McDonald & Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Superior Meter Co.
Taylor Instrument Companies.

THERMOSTATS
The Bristol Company.
Brown Instrument Co., The
The Cleveland Heater Company.
Consolidated Ashcroft Hancock Co., Inc.,
Precision Thermometer & Instrument Company.
Robertshaw Thermostat Co.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

TOASTERS
American Gas Products Corp.
Savory Co., Inc.,

TOOLS
Semet-Solvay Engineering Corp.

TORCHES—WELDING AND CUTTING
Alexander Milburn Co.
Oxweld Acetylene Co.
Union Carbide & Carbon Co.

TRAPS—STEAM
James B. Clow & Sons.
Consolidated Ashcroft Hancock Co., Inc.

TRENCH DIGGERS
The Cleveland Trencher Co.

TUBES, BOILER
National Tube Co.
Pittsburgh Steel Products Co.

TUBES
Seamless Steel
Pittsburgh Steel Products Co.

TYPEWRITERS
Consolidated Ashcroft Hancock Co., Inc.,
Remington Rand, Inc.

U GAUGES
American Meter Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Safety Gas Main Stopper Co.
Superior Meter Co.
Taylor Instrument Companies.

VACUUM GAUGES
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.,
Lambert Meter Co.
Pittsburgh Equitable Meter Co.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

VALVES
Bartlett-Hayward Co.
James B. Clow & Sons.
Consolidated Ashcroft Hancock Co., Inc.,
Darling Valve and Manufacturing Co.
The Gas Machinery Co.
Groble Gas Regulator Co.
C. W. Hunt Co., Inc.
The Ludlow Valve Mfg. Co.
Pittsburgh Equitable Meter Co.
Semet-Solvay Engineering Corp.
High Pressure Special
Smoot Engineering Corp.
Time-O-Stat Controls Co.

VALVES—BY-PASS
The P. H. & F. M. Roots Company.

VALVES—DIAPHRAGM
The P. H. & F. M. Roots Company.
Time-O-Stat Controls Co.

VALVES & FITTINGS
Darling Valve and Manufacturing Co.
James B. Clow & Sons.
The Gas Machinery Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
The Western Gas Construction Company.
Time-O-Stat Controls Co.

VALVES—HUNTOON
The P. H. & F. M. Roots Company.
Time-O-Stat Controls Co.

VALVES—RELIEF
The P. H. & F. M. Roots Company.

VALVES—3 Way
Semet-Solvay Engineering Corp.

WASTE HEAT BOILERS (See Boilers)
The Gas Machinery Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.

WATER GAS APPARATUS
Bartlett-Hayward Co.
The Gas Machinery Co.
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.

WELDING EQUIPMENT
Oxweld Acetylene Co.

CLASSIFIED ADVERTISEMENTS

Rate at $5.00 per inch for first insertion. $4.00 per inch for each additional insertion of same Copy. Positions wanted—$2.00 per issue.

POSITION OPEN

Holding Company desires the services of good distribution engineer thoroughly competent to take over construction of transmission and distribution lines. State qualifications and salary expected in first letter. Address Box 962, c/o American Gas Journal, 53 Park Place, N. Y. C.

WANTED—A New England States salesman to represent a large coal Company. Must be familiar with genuine Youghorgheny Gas Coal. A worth while arrangement will be made with the right party. Address Box 957, c/o American Gas Journal, 53 Park Place, New York City.

WANTED—SALESMAN—For a high-grade line of Gas Ranges, both domestic and hotel types—one with experience and some acquaintance with Public Service Companies in Michigan, Indiana, Illinois and Iowa preferred. A good opportunity for a live man. Address Box 960, c/o American Gas Journal, 53 Park Place, New York City.

POSITION WANTED

Position Wanted by practical gas manager with 25 years experience. Coal & Water Gas. High & Low Pressure Good merchandiser. Will go anywhere. Available immediately. Address Box 961, c/o American Gas Journal, 53 Park Place, New York City.

MANUFACTURER'S REPRESENTATIVE desires to make contact with manufacturer as a sales representative. Had three years experience as sales engineer in house heating and all types of domestic appliances and industrial work. Three years selling specialties and four years as a vocational training officer. Young, energetic. Married. Address Box 954, c/o American Gas Journal, 53 Park Place, N. Y. C.

SALESMAN, with wide experience, including sales promotion, desires connection as representative for manufacturer. Acquainted with gas companies and dealers in territory from Boston to Washington. Proposition on agency basis for Eastern territory or Pacific Coast also considered. Address Box No. 959, c/o American Gas Journal, 53 Park Place, New York City.

A Successful Manager and Operator desires to make a change from present location and will welcome communication from parties interested in securing the services of such a man. Address Box No. 963, c/o American Gas Journal, 53 Park Place, N. Y. C.

A thorough experienced Gas Salesman having a broad acquaintance with Gas Companies and Gas Appliance Dealer trade, desires to make connection with some reliable gas Appliance Manufacturer to represent them in the eastern territory. Address Box No. 958, c/o American Gas Journal, 53 Park Place, N. Y. C.

Salesman with wide acquaintance amongst Gas Companies and dealers in Pennsylvania, New Jersey, West Virginia, and New England desires to make change and would represent manufacture of quality product in any of territory named. Can furnish A. 1. references. Available March 1st. Address Box No. 964. c/o American Gas Journal, 53 Park Place, New York City.

FOR SALE

GAS PLANT EQUIPMENT: Capacity 5,500,000 cu. ft. Consisting of 4 - 10' Lowe Water Gas Sets; 2 - Hinman. Drum Station Meters, and all auxiliary apparatus—where and as is. For details apply,
J. F. Hunter, Engr. of Construction,
Consolidated Gas Co. of New York,
No. 4 Irving Place, New York City.

AMERICAN LIGHT & TRACTION COMPANY
"DIVIDEND NOTICE"

The Board of Directors of American Light & Traction Company, at a meeting held January 8, 1929, declared a CASH DIVIDEND of one and one-half per cent (1-½%) on the Preferred Stock, and a CASH DIVIDEND of two and one-half (2½%) on the Common Stock, both payable February 1, 1929, to stockholders of record at the close of business January 17, 1929.

The transfer books will close at 3 o'clock P. M., January 17, 1929, and will reopen at 10 o'clock A. M., January 29, 1929.

James Lawrence
Secretary

GEORGE H. WARING
CONSULTING ENGINEER
624 GRAND RAPIDS NATIONAL BANK BLDG.
Grand Rapids, Mich.

The New 1928 Improved
FRANKLIN Gas Burner—

Automatic regulation of air assures intense blue flame under all conditions. Burns natural or artificial gas or their combination. Flame will not extinguish on low pressure. No backfiring in the mixer. Approved by the fire insurance companies.

Patented and Manufactured Exclusively by

THE FRANKLIN GAS APPLIANCE CO.
CINCINNATI, OHIO

SERVICE TO THE INDUSTRY

REORGANIZATIONS and MERGERS

of the Public Utilities resulting in economies of operation have benefited the entire gas industry.

MANUFACTURERS OF GAS APPLIANCES now realize the necessity of a similar development in their industry if they are to be of real service to the Utilities in the matter of future sales and dealer cooperation.

INVESTIGATION OF THE INDUSTRY

has shown decided opportunities for economies in manufacturing and marketing. Many manufacturers can improve their situation by *Reorganization, Merger or Refinancing.*

PERMANENT CAPITAL—

is available through my association with reliable banking institutions in Chicago—New York—Philadelphia.

THIS SERVICE IS CONFIDENTIAL—

May we have the pleasure of serving you?

CHARLES W. WARDELL

2401 CHESTNUT STREET, PHILADELPHIA, PA.

ALPHABETICAL LIST OF ADVERTISERS

Alpha Lux Co., Inc. ..... Front Cover
Aluminum Company of America 21
American Gas Products Corp. 92
American Lava Corp. 110
American Meter Co. 67-70
American Schaeffer & Budenberg Corp. .....
(See Consolidated Ashcroft Hancock Co.)
American Stove Co. 58
Andale Engineering Co. 115

Bartlett Hayward Co. 22
Botfield Refractories Co. 16
Bristol Co., The 99
Brown Instrument Company 101
Bruce McDonald Co., The 110
Byllesby Engineering & Management Corp. ... 108

Cast Iron Pipe Research Assn. 103
Chaplin-Fulton Mfg. Co. 104
Cheesman-Elliott Co., Inc. 79
Cleveland Gas Burner & Appliance Co., The .. 88
Cleveland Gas Meter Co., The 97
Cleveland Heater Co. 110
Cleveland Trencher Co. 105
Clow & Sons, James B. 83
Connelly Iron Sponge & Governor Co. 119
Connersville Blower Co. 11
Consolidated Ashcroft Hancock Co., Inc. 108
Cruse-Kemper Co. 13

Darling Valve & Mfg. Co. 81
Dresser, S. R., Mfg. Co. 19
Dry Quenching Equipment Corp. 8

Eaton Kent, Inc. 77

Franklin Gas Appliance Co., The 119

Gas Engineering Co. 117
Gas Machinery Co. 10
Gas Purifying Materials Co. 113
Griffin, John J., & Co. 67
Groble Gas Regulator Co. 115

Helme & McIlhenny 67
Homestead Heater Co. 115
Hotel Chelsea 115
Humphrey Company 93
Hunt, C. W., Co., Inc. 113

Improved Equipment—Russell Engr. Co. 117
Indugas Corp. 12
Isbell-Porter Co. 117

Kompak Company 87
Koppers Construction Co. 2

Lambert Meter Co. 106
Lamneck Co., The W. E. 113
Lavino & Co., E. J. 117
Ludlow Valve Co. 108

McDonald & Co., D. 67
McWane Cast Iron Pipe Co. 107
Maryland Meter Works 67
Metric Metal Works 67
Mueller Company 89

National Tube Co. 109
Naylor Pipe Co. 111

Pittsburgh Coal Company 14
Pittsburgh Equitable Meter Co. 122
Pittsburgh Steel Products Co. 98
Pittsburgh Water Heater Co. 56-57
Precision Thermometer & Instrument Co. 102

Quigley Furnace Specialties Co. 106

Refractory & Engineering Corp. 102
Reynolds Gas Regulator Co. 20
Ridgway & Son Co., Craig 85
Riter-Conley Co. 104
Roberts Gas Burner Corp. 94
Robertshaw Thermostat Co. 96
Roots Co., P. H. & F. M. 18
Roper Corp., Geo. D. 91

Safety Gas Main Stopper Co. 104
Semet-Solvay Engineering Corp. 5
Smith Corp., A. O. 90
Smoot Engineering Corp. 6
Sprague Meter Co. ..... Fourth Cover
Stacey Brothers Gas Construction Co. 55
Stacey Manufacturing Co. 4
Superior Meter Co. 85

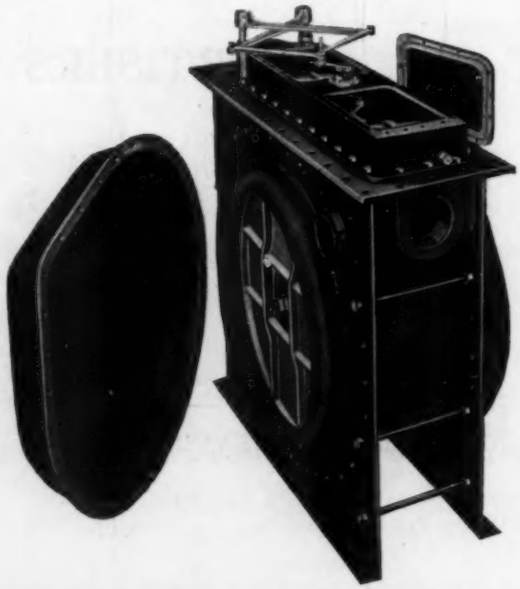
Taylor Instrument Companies 106
Time-o-Stat Controls Corp. 95
Tufts Meter Works, Nathaniel 67

Unger, John S. 117
Union Carbide & Carbon Corp. 15
United Engineers & Constructors, Inc. 7
U. S. Cast Iron Pipe Co. 9
United States Refractory Corp. 115

Victaulic Co., of America 17

Wailes, Dove, Hermiston Corp. 123
Wardell, C. W. 120
Waring, George H. 119
Welsbach Company 73
West Gas Improvement Co. 75
Westmoreland Coal Co. 117

BUYERS' REFERENCE INDEX, PAGES 112, 114, 116, 118



Inside the EMCO *Five*

The pressed steel meter that revolutionized large capacity gas measurement

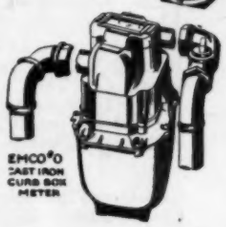
TEN thousand cubic feet per hour measured with a pressure drop of less than two inches of water, has been made possible by the pressed steel case construction, tested at a pressure of 100 pounds per square inch. Diaphragms are of sheepskin, formed and seasoned carefully, mounted on terne iron pans, which are reinforced to maintain absolute rigidity.

The tangent adjustment is a new and exclusive feature. The flag rod and movement have been designed by our engineers to eliminate any chance of giving trouble. The EMCO exclusive valve arrangement, whereby valves are set in line with each other, includes valves and valve seats of special white metal alloys worked out in our own laboratories.

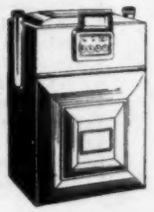
EMCO—*Wherever you go*

EMCO #0 CAST IRON DRY GAS METER

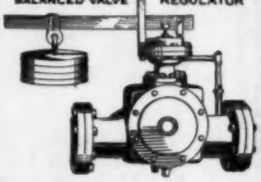
IRONCLAD CAST IRON DRY GAS METER



EMCO #0 CAST IRON CUBIC INCH METER

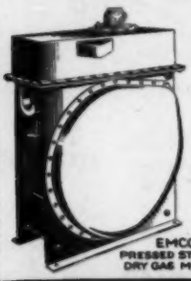


EMCO TIN METER



EMCO HIGH PRESSURE BALANCED VALVE REGULATOR

EMCO WATER HEATER AND GAS APPLIANCE REGULATOR



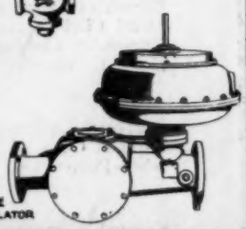
EMCO #5 PRESSED STEEL TYPE DRY GAS METER

WESTINGHOUSE FLUID POSITIVE GAS METER

EMCO LARGE CAPACITY CAST CASE DRY GAS METER WITH EMCO COMBINED RECORD GAUGE

EMCO ORIFICE GAS METER

EMCO DOMESTIC SERVICE REGULATOR



EMCO LOW PRESSURE BALANCED VALVE REGULATOR

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS
TULSA SEATTLE KANSAS CITY SALT LAKE CITY

Why Experiment with Pipe Protection when You Have Such Proofs as These?

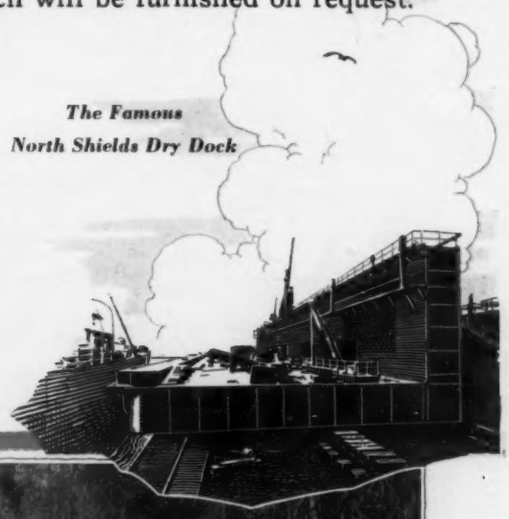
PROOF

PROVEN PROTECTION FOR PIPE LINES

The service rendered by ***Bitumastic Enamel*** on the North Shields Dry Dock is but one of the many proofs which have led engineers to adopt ***Bitumastic Enamel*** for protection of the largest gas and oil lines in the world. "Why," they reason, and quite rightly, "should *anyone* experiment when we have such proofs as these?" Write for the complete history of ***Bitumastic*** performance in pipe line and all other fields which will be furnished on request.

"Eventually all underground pipe may be expected to fail from corrosion and from nothing else." The same may be said of metal structures *above* ground where often the conditions of corrosion are even more severe. The famous pontoon dry dock at North Shields, England, was protected with ***Bitumastic Enamel*** when built and was alternately immersed in salt water and exposed to air for a period of twenty-eight years. At the end of this time the *original* coating of ***Bitumastic Enamel*** was found to be in such perfect condition that not a single foot of it had to be renewed.

The Famous North Shields Dry Dock



The Interstate Line

A 22" line laid by the Interstate Natural Gas Company from Monroe, La., to Baton Rouge. 85 miles of the original line, also the extension from Destrehan to New Orleans, protected with Bitumastic Enamel. Two new loops, now under construction, are receiving the same protection.

BITUMASTIC
REG. U.S. PAT. OFF.
ENAMEL

Wailes Dove-Hermiston Corporation

17 Battery Place, New York

Philadelphia Cleveland Chicago Houston Tulsa San Francisco

Six Major Improvements

1 **Sprague Special Diaphragms**
Acid resisting, semi-chrome retanned leather

2 **Enclosed Top Bracket**
Protects and lubricates the worm and gear

3 **Improved Valve Cover**
Eliminates possible breakage in transit

4 **Raised Bosses on Flanges**
Eliminate seepage in wet gases

5 **Bronze Bushed Links**
Reduce wear and lost motion

6 **Improved Adjusting Tools**
Reduce shop costs

All designed to better the one and a half million Sprague Meters in Service

THE SPRAGUE METER CO.
BRIDGEPORT, CONN.